

THE THIRD EDITION  
EVERYMAN'S ENCYCLOPÆDIA  
IN TWELVE VOLUMES

VOLUME ONE  
A — BALANINUS

EDITED BY ATHELSTAN RIDGWAY, LL.B.





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**RETROCONVERTED**  
**B. C. S. C. L.**



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# ABBREVIATIONS

The titles of subjects, which are printed first in bold type, have been abbreviated within each article to the initial letter or letters.

ac., acre(s).  
 agric., agricultural.  
 ambas., ambassador(s).  
 Amer., American.  
 anct., ancient.  
 ann., annual.  
 arron., arrondissement.  
 A.-S., Anglo-Saxon.  
 A.V., Authorised Version.  
 b., born.  
**Biog. Dic.**, Biographical Dictionary.  
 bor., borough.  
 bp., birthplace.  
 Brit., British.  
 C., Centigrade.  
 c., about.  
 cap., capital.  
 cf., compare.  
 co., county.  
 com., commune.  
 cub. ft., cubic feet.  
 d., died.  
 Dan., Danish.  
 dept., department.  
 dist., district.  
 div., division.  
 E., east; eastern.  
 eccles., ecclesiastical.  
 ed., edition; edited.  
 e.g., for example.  
**Ency. Brit.**, Encyclopædia Britannica.  
 Eng., English.  
 estab., established; establishment.  
 F., Fahrenheit.  
 fl., flourished.  
 fort. tn., fortified town.  
 Fr., French.  
 ft., feet.  
 Ger., German.  
 Gk., Greek.  
 gov., government.  
 Heb., Hebrew.  
 hist., history.  
 horticult., horticultural.  
 h.p., horse-power.  
 hr., hour.  
 i.e., that is.  
 in., inch(es).  
 inhab., inhabitant(s).

is., island(s).  
 It., Italian.  
 Jap., Japanese.  
 jour., journal.  
 Lat., Latin.  
 lat., latitude.  
 lb., pound(s).  
 l. b., left bank.  
 long., longitude.  
 m., mile(s).  
 manuf., manufacture.  
 min., minute(s).  
 mrkt. tn., market town.  
 MS., manuscript.  
 mt., mount; mountain.  
 N., north; northern.  
 N.T., New Testament.  
 O.E., Old English.  
 O.F., Old French.  
 O.T., Old Testament.  
 oz., ounce(s).  
 par., parish.  
 parl., parliamentary.  
 pop., population.  
 prin., principal.  
 prof., professor.  
 prov., province; provincial.  
 pub., published; publication.  
 q.v., which see.  
 R., riv., river.  
 r. b., right bank.  
 Rom., Roman.  
 R.V., Revised Version.  
 S., south; southern.  
 sec., second(s).  
 sev., several.  
 Sp., Spanish.  
 sp. gr., specific gravity.  
 sq. m., square mile(s).  
 temp., temperature.  
 ter., territory.  
 tn., town.  
 trans., translated; translation.  
 trib., tributary.  
 univ., university.  
 urb., urban.  
 vil., village.  
 vol., volume.  
 W., west; western.  
 Wm., William.  
 yd., yard.

The article ABBREVIATIONS contains a list of those in general use.  
 See also ABBREVIATION (music) and ELEMENTS (chemical symbols).



# A

**A** is the first letter in the Eng. alphabet, as in all the European alphabets. It is derived through the Lat. and Etruscan from the Gk. *alpha*, and we still retain in our cap. A the Gk. and Rom. lapidary form. The Gks., who learned the art of writing from the Phoenicians (see ALPHABET), borrowed this letter from the Semites. Indeed, whereas the Gk. name is meaningless in Gk., the Semitic name, *aleph*, is a word in the Semitic languages, meaning ox, as the Phoenicians thought it resembled the head of an ox. Our small a, in both its forms, *italic* (a) and *roman* (a), derives from the Caroline form (employed in the Frankish empire at the end of the eighth century), which in its turn descended from the semi-uncial book-hand (used from the fifth to the ninth century). The Venetian minuscule, nowadays known as *italics* (introduced in Florence in the fifteenth century), and the Rom. type of letters (perfected in N. Italy, chiefly at Venice, where it was used in the printing presses about the end of the fifteenth century), were here adopted. from Italy, in the sixteenth century. The black letter or Gothic, also developed from the Caroline (at the end of the twelfth century) and employed in N.W. Europe, including England, until the sixteenth century, is still used in Germany as the 'national' hand.

The Semitic *aleph* was (and still is, for instance, in Hebrew) a consonant, not a vowel. Its sound was that of a guttural breathing, and, strange to say, this sound is perhaps the most commonly represented by our own A, as in *aboard*, *aground*, etc. The Gks. adopted the symbol to represent what is now the general continental pronunciation of A, but which is rather rare in Eng.; this is the purest and simplest vowel sound, and is uttered by opening the air passage to its fullest extent, as in *father*. It is regarded as the primitive vowel sound. The third sound represented by A is that in the word *call*; this sound should really be represented by *au*, and is influenced by the double consonant at the end of the word in which it occurs. The modified pronunciation of A, as in the word *tame*, is partly due to the mute vowel *e* at the end of the word. Again, in words like *care*, *pare*, *rare*, A represents a sound which might be more accurately represented by the diphthong *ai*. Finally, we come to the short A as in *cat*, which is the most common in the conversation of educated people. These sounds are modified in the various dialects of the country.

The letter A is the most easily pronounced of the vowels, requiring neither the retraction of the lips like *i* (= *ee* in *feet*), nor their propulsion as in *u* (= *oo*).

A is readily interchanged with O, as in the Ger. and Eng. *kalt*, *cold*. It

is interchanged also with E. Thus the Rom. generally substituted an A where we now find E in Ger. names, as *Albis* for *Elbe*; *Amisia* for *Ems*. A is interchanged with I, as in the Gk. *ai*, *av*, and the Lat. *in*, and in the Lat. *sine* and the Fr. *sans*.

A (in music), see SCALE.

A or An, the indef. art., a being used before a consonant, an before a vowel; as *a king*, *an emperor*. Sometimes a virtual consonant exists at the beginning of a word without being written, as in *union* and *once*; before these words it is customary to drop the final letter of the article in conversation and writing. When an *h* is mute, however, we may at the risk of pedantry retain the *n* in writing and speaking; thus, *a history*, *an historical work*. That *an* and not *a* was the original form is proved by the A.-S. *an* and the Ger. *ein*; indeed our numeral one is nothing but a form of it. The *a* in 'three shillings a pound,' however, is not an indefinite article but a deteriorated form of an O.E. preposition. The double form of our article has caused certain words to be wrongly written, as *a neut* for *an eul* (*eft*). The letter *a* often appears prefixed to a word, as in *aside*, *afont*, *aboard*, *nowadays*, etc.; these are derived from *on syde*, *on fote*, *on borde*, *now-on-daies*, all of which forms are found in our old Eng. poets; this *on* is an A.-S. preposition meaning *in*. In many places *a* now takes the place of *on*, as 'he fell asleep,' which in an old version of the N.T. was 'he fell on sleep.'

**Aa**, the name of sev. small rivs.—3 in Germany, 1 in Switzerland, 2 in Holland, 2 in Latvia, and 1 in France. The Fr. riv. is in the Pas-de-Calais dept., and flows through Gravelines and St. Omer.

**Aach**, a small riv. and tn. Baden, Germany. The tn. is situated near the source of the riv. Pop. 1000.

**Aachen**, the Ger. name for Aix-la-Chapelle, a historic cathedral city in Rhineland, Germany, 40 m. W.S.W. of Cologne. In 1668 a peace signed at A. terminated the Franco-Sp. war; the second war of the Austrian Succession was ended there by a treaty (1748); and in 1818 a congress met there to settle the disposition of Europe after the Napoleonic wars. The cathedral was begun by Charlemagne in 796. Under its dome was placed his tomb, opened in 1000 and found to contain the emperor's body, imperially robed and seated on a marble throne; his remains were later put into a shrine. Its manufs. include textiles, needles, machinery, rubber tyres, and electric light bulbs. Before the Second World War the sulphur springs of A. were much patronised, some being of 136°. There is a fully equipped technical high school, with the right of granting degrees.

**Pop.** (1939) 165,700. The city prospered from 1815, owing to the neighbouring coal-mines. A. fell to the Amer. forces on Oct. 20, 1944, after a week's bitter fighting in the streets. Despite the fact that much of the city was reduced to rubble, the cathedral was comparatively little damaged by the bombardment. In the octagon chapel, which was untouched, Charlemagne's throne was found by the Amers. still there in its gallery encased in concrete. Many other religious and historic relics had been removed from A. before it became a battlefield. The tn. hall was a shattered mass of broken masonry and shapeless roofs, with the metal girder-work of its towers fantastically twisted by fire. *See also* WESTERN FRONT IN SECOND WORLD WAR, *Battle of Aachen*.

**Aaland Islands**, the chief is in an archipelago of the same name consisting of more than 6500 is. islets, and skerries, at the entrance to the gulf of Bothnia, forming part of Finland. Only about two of the is. are inhabited. Taken from Sweden by Russia in 1809, and occupied by the Allies in 1854. They were used in the First World War by the Gers. as a naval base, but in 1921, neutralised and demilitarised under a convention signed by Great Britain, France, Italy, and all the Baltic states except Russia, and the forts razed. A plebiscite taken in the same year was favourable to self-gov. but the is. now form part of the republic of Finland.

In 1939 an agreement was concluded between the Finnish and Swedish Govs for the remilitarisation of the is., and approved by the signatories of the 1921 convention, but action was blocked by Soviet opposition. The is. are of the greatest strategic importance because they dominate the entrance to Finland, Russia, and N. Sweden. **Pop.** 28,000.

**Aalborg**, in N. Jutland, on the S. side of the Limfj. Fiord, is a cathedral tn. and the seat of a bishopric. It exports cattle, hides, wool, dairy produce. Bombed by the R.A.F. in Apr. and May, 1940. **Pop.** 42,820.

**Aalborg Amt**, the most N. div. of Jutland, the cap. of which is Aalborg (q.v.).

**Aalen**, a tn. on the Kocher, near Stuttgart in Wurttemberg, Germany, pre-war manufs. iron and woollen goods, **pop.** 14,600.

**Aalesund**, a tn. in Romsdal, Norway, a great port for cod-fishing; burnt down in 1904, but rebuilt since; bp. of Rollo. Has broadcasting station. **Pop.** 13,400.

**Aali Pasha** (1815-71), a Turkish statesman. At the Congress of Paris he represented Turkey, and maintained its rights with great skill. He helped to put down the Cretan rebellion (1867-68) and subdued the khedive of Egypt (1869). From 1861 to his death he shared with Fuad Pasha the post of vizier.

**Aalst**, *see* ALOST.

**Aalten**, a vil., Gelderland, Holland, **pop.** 7500.

**Aamot**, a tn., Hedemarken, Norway, noted for textiles; **pop.** 3500.

**Aar**, a trib. of the Rhine; rises in the Grimsel in Switzerland and flows through Lakes Brienz and Thun, joining the Rhine near Waldshut. On its banks are Moringen, Interlaken, Thun, Berne, Aaberg, Soleure, Aarburg, Aarau, and Brugg. It has sev. tribs., among which are the Reuss and the Limmat. It is 170 m. long.

**Aarau**, cap. of Aargau, Switzerland, on the Aar, 40 m. N.E. of Berne, manufs. silk, leather, cotton goods, mathematical instruments, **pop.** 12,000. Here met the assembly of the diet of the cantons, 1798, and proclaimed the Swiss Republic.

**Aardvark**, the (Cape ant-bear), is an animal closely related to the great anteater. It has large pointed ears, tapering snout and tail, stumpy legs, a long slimy tongue, and little hair on its body. Its name (*aard-vark*) is the Dutch for earth-pig, a very appropriate one, as it resembles the pig in its burrowing and grubbing, for which its sharp snout is of great use. Its hams are esteemed as good as those of a pig. When fully grown it is about 5 ft. long. During the heat of the day it lies in its burrow. It is the only ant-eater possessing teeth, having 7 molars on each side above and 6 below. It is very timid, and if pursued burrows very rapidly: it can be killed by a smart blow on the snout. *See* ANT-EATER.

**Aardwolf**, the (*Proteles cristatus*), is an African animal 3 ft. 6 in. in length, of yellowish-grey colour, with heavy dark stripes and a long bushy tail. It resembles a young hyæna; it has peculiar teeth: the first 3 above are false and the fourth is small: it has no cutting teeth. As its name indicates, it is a burrowing animal, of nocturnal habits and timid disposition. It is like the hyæna in its taste for carrion and termites, which it digs up with its sharp claws.

**Aarestrup**, Carl Ludvig Emil (1800-1856), a Dan. poet, b. in Copenhagen. He pub. *Aftenladte Digte* in 1838, which made some stir, but it was not till after his death, when Brandes edited his *Samlede Digte* (1877), that he became known throughout Denmark as one of the greatest lyric poets.

**Aargau**, or **Argovie**, a canton of Switzerland, taking its name from the Aar, which flows through it. It is bounded on the N. by the Rhine, on the S. by the canton of Lucerne. Area about 550 sq. m. Became democratic after the war of the Sonderbund in 1841. In the fertile parts the people are engaged in agriculture, dairy farming, and cattle-breeding. **Prin. tns.** Aarau (cap.), Baden, Brugg, Laufenburg, Lenzburg. **Pop.** 260,000; the majority are Protestants.

**Aarhus**, second port in Denmark; has a good harbour, improved 1880-90, exports grain, flour, dairy produce, oysters, and tallow; imports coal, timber, wine, sugar, tobacco, and manufactured goods, it has long been the seat of a bishop and has a large cathedral; **pop.** 91,000.

**Aarhus Amt**, a div. in the E. of Jutland; cap. Aarhus (q.v.); pop. 120,000.

**Aaron** (Heb. 'Aharôn), brother of Moses, 3 years his senior. He seems to have acquired some influence with his tribe, the Levites, and by divine suggestion he came to meet Moses and assembled the elders to confer with him (Ex. iv.). He became the associate and spokesman of his brother in their interviews with Pharaoh (Ex. v.). The priesthood was fixed in his line (Ex. xxviii.). While Moses was on the mt. A. was intimidated into making the golden calf (Ex. xxxii.). Notwithstanding this A. was not deprived of the priesthood. He was consecrated high priest (Lev. viii.), and his consecration was ratified by the budding of his rod, while the rods representing the other tribes remained unchanged (Num. xvii.). He married Elisheba and had 4 sons.

**Aaron's beard**, the common name for *S. sarmentosa* of the order Saxifragaceae. It is a well-known Chinese plant usually grown in a hanging basket. The name is also applied to the *Hypericum calycinum*, the large-flowered St. John's wort.

**Aarschot** or **Aerschot**, tn. of Brabant, Belgium, on the R. Demer. Was a fortified crossing place in Rom. times. In Aug. 1914 the Gers. shot more than 150 of its inhab. on various pretexts; about 400 houses went up in flames and another 1000 were pillaged. Important agric. centre. Pop. 8750.

**Aarsens, Frans van** (1572-1641), Dutch diplomatist. Ambass. to France, England, Venice, enemy of Barneveldt.

**Aartsen, Pieter**, see **ARTSEN, PIETER**.

**Aasen, Ivar** (1813-96), b. in Romsdal, Norway, self-educated; studied the Norwegian dialects, in which he was regarded as the greatest authority. Attempted to construct from them a composite language; pub. a grammar (1848), and a dictionary (1850) of the 'Norwegian Popular Language.' In this composite language he wrote plays and poems.

**Aazariyeh, El**, see **BETHANY**.

**Ab**, the eleventh month of the Jewish civil year, corresponding to a part of July and a part of Aug.; it does not occur in the A.V. of the Bible, but is often found in the Talmud.

**Ababde**, a vil. of Middle Egypt, on the Nile, near which are found ruins of Antinôe, a city built by Hadrian and named after Antinous, and also ruins of Bosa.

**Ababde**, a nomad tribe of Hamitic people, partly of Arabian descent, who dwell between the Nile and the Red Sea. They are hospitable and honest, but at times treacherous, they travel extensively. Their homes are huts and caves, and their speech is usually Arabic. They possess herds of sheep and goats, the camel is their beast of burden, and they trade in gum and senna. In number they are nearly 40,000.

**Abaca**, the Philippine name for *Musa terilis*, yielding fibre for ropes and cordage; cultivated in the Philippines, whence exported; resembles banana in growth. See **HEMP**, **MANILA HEMP**, **BANANA**, **FIBRE**.

**Abacenum**, anct. tn. of the Siculi in Sicily, W. of Messina and S. of Tyndaris.

**Abaco**, see **BAHAMAS**.

**Abaculus**, a small tile of glass or marble used in mosaic work.



Norman: New Romney, Kent



Early English: Oxford Cathedral Chapter House



Decorated: Merton College Chapel



Perpendicular: Henry VII. Chapel, Westminster

#### ABACUS, IN ARCHITECTURE

**Abacus**, instrument used for aiding calculation; the name may be given to any machine for counting with beads, etc., in which one row stands for units, another for tens, etc. In England it is only used nowadays in infant schools to teach children to count. Used by Romans, and still used in parts of Russia, China, and Persia. Also. 1, in architecture a flat stone at the top of a column; 2, a dice board; 3, a mathematician's table covered with sand on which figures were drawn; 4, a sideboard.

**Abadan**, is. at entrance to Persian Gulf, with oil refineries. Pop. 40,000.

**Abaddon**, the name given to the king of the mystical army of locusts (Rev. ix.), the 'angel of the bottomless pit.' The Gk. equivalent is Apollyon. The Heb. term occurs thrice in Job, twice in Proverbs, and once in Psalms, rendered by 'destruction.' It is thrice associated with 'Sheol,' and once with 'Death.'

**Abadeh**, a tn., Persia, halfway between Isfahan and Shiraz, noted for wood-carving and fruit; pop. 10,000.

**Abakansk**, a tn. on the Yenisei, in the Khakass Autonomous Region of the R.S.F.S.R., noted for coal-mines; pop. 36,000.

**Aballo**, see **AVALON**

**Abalone**, or ear shell, a shell fish of the family *Haliotidae* found chiefly on Californian coasts and largely used for food

**Abana** or **Amana**, one of the rivers of Damascus (2 Kings i), now the Barada the Gk *Chrysorroas*

**Abancay**, cap of Apurimac Peru near Cuzco, noted for sugar pop 6000

**Abancourt, Charles Xavier Joseph d'** (1759-92), b at Douai supporter of Louis XVI minister during the Revolution in 1792 appointed minister of war, declared an enemy to freedom and murdered at Versailles by the mob Sept 9 1792

**Abandonment**, see **PARENT AND CHILD HUSBAND AND WIFE DEFECTIVE SALVAGE INSURANCE MARINE, NOLE PROSLOU DOMICIL**

**Abanilla**, in Murcia, Spain pop 6500

**Abano, Pietro di (Petrus Aponus)** (1250-1316) b at Abano Bagni (qv) studied first at Padua went to Constantinople to study Gk, and after wars to 1288 studying medicine and mathematics. Travelled in England and Scotland but in 1303-4 was recalled to Padua to be prof of medicine his reputation was great and his fees high. With astronomy he studied astrology and made some pretence to magic. In 1306 this study brought him before the Inquisition as a magician but he cleared himself. In 1314 he was invited to Treviso where he went next year an other accusation was brought against him and he came up for trial, he d, however before judgment was given the inquiry continued after his death he was found guilty and his body was burned. He wrote scv works on philosophy and medicine, and made translations of ancient and Arabic medical writers. He was the most learned physician of his time.

**Abano Bagni**, a vil near Padua in Italy. It has hot springs, known to the Romans as *Aponi Fons* or *Aque Pataviana*. Bp of Pietro di Abano pop 4600

**Abantes**, ancient inhab of Fubcea said to have been of Thracian origin to have first settled in Thracia where they built Abae and afterwards crossed to Euboea they assisted in colonising scv of the Ionic cities of Asia Minor

**Abanto y Ciervana**, a tn in the prov of Vizcaya Spain, containing rich iron mines pop 7000

**Abarbanel, Abrabanel, or Abarbenel, Isaac Ben Jehudah** (1437-1508) Jewish statesman and author b at Lisbon of an ancient Jewish family. Distinguished for his learning and wealth, minister of state to King Alfonso V of Portugal. Suspected of treason by John II and had to escape. Served Ferdinand King of Aragon, until the expulsion of Jews from Spain 1492. Lived thenceforward in Naples and Venice where he d 1508. Wrote commentaries on the OT and the expected Messiah. His first son, Leo Hebraeus (Juda Leon), a doctor and philosopher wrote *Dialoghi di amore* (1535), his second son, Joseph, was a

doctor at Venice and Ferrara, and the third son, Samuel, a statesman

**Abaris**, legendary Hyperborean priest of Apollo, came from near Caucasus to Greece during a plague said to have taken no earthly food, and to have ridden through the air on an arrow the gift of Apollo. See Herodotus iv 36

**Abas**, 1 Son of Metanira changed by Demeter into a lizard because he mocked the goddess when drinking to quench her thirst in his mother's house, where she had come on her wanderings. See Ovid *Metam* v 451 61

2 Twelfth king of Argos, grandson of Danaus and father of Acrisius and Proetus received as a reward the shield of Danaus which had the power of reducing a revolted people to submission

**Abasia**, see **ABIAHAZIA**

**Abate Ciccio**, P, see **SOLIMENA, FRANCESCO**

**Abatement**, derived from O Fr word *abatir*, to prostrate or destroy

In a literal sense to destroy as to abate a nuisance. See **NUISANCE**

In the old law of pleading a plea in abatement was one which showed some reason for abating or quashing the plaintiff's statement of claim on the ground that it was improperly framed, without at the same time tending to deny the right of action itself (i) the misnomer of a defendant, or the non joinder of a necessary party. But for long the Orders and Rules of the Supreme Court have abolished all such pleas. The defendant must himself correct the misnomer, and he may, if he thinks fit, take out a summons to have the missing plaintiff or defendant made a party.

In heraldry a mark of dishonour on a coat of arms for some stain in the character of the wearer. The only A now used is the *baston* to indicate bastardy.

**Abati, Abatti, or Abbate, Niccolò** (1512-71) b at Modena executed in fresco under Primiticcio (qv). The Adventures of Ulysses in the palace at Fontainebleau, originals destroyed but prints were pub by Van Hulden in Paris, 1630. His best known easel work. The Martyrdom of St Peter and St Paul painted on wood for the church of the Benedictines at Modena (1546) is now in the gallery at Dresden. Between the years 1546 and 1552 he lived at Bologna, where he painted and worked in fresco. After this he accompanied Primiticcio to France where he d at Paris (1571). He has been compared to Titian and Raphael. His brother Pietro Paolo was a clever horse and battle painter. His son Giulio Camillo his grandson Ircole, and his great grandson Pietro Paolo were all painters. Ircole, b at Modena, 1563 d 1613, executed with B S bidoni frescoes of the council hall of Modena.

**Abatis** or **Abattis**, in military art a number of felled trees with smaller branches cut off, and placed side by side with their butt ends towards the defenders, and secured to the ground by forked pickets, serves as an obstacle to the advance of an enemy.

**Abattoir**, the name given to the public



slaughter house estab in Paris by a decree of Napoleon, finished 1818 first estab in Great Britain at Edinburgh 1851, Islington, 1855 now in all towns where many cattle are slaughtered under careful inspection to prevent the sale of unwholesome meat. The site should be outside the city, within easy access of the cattle market, the floors and walls to a certain height should be tiled to prevent absorption, all woodwork should be avoided and proper accommodation for killing, dressing and cooling should be provided, the offal should be destroyed or removed immediately, this can be used for manure, there should be a separate chamber for the preparing of the feet and intestines. The largest cattle and hog-killing centre in the world is Chicago (qv). See also under ABUL TERATION.

**Abba** (Syriac for father) a word occurring 3 times in the N I (Mark xiv 36, Rom viii 15, Gal iv 6), always with its translation subjoined. In the Syriac, Coptic and Ethiopic Churches the title came to be applied to the bishops.

**Abbadie, Antoine Thompson d'** (1810-1897) b at Dublin, educated in France, 1835 sent on mission to Brazil by the Académie des Sciences. 1837-48 explored Abyssinia. 1867 made a member of above academy. 1882 went to San Domingo to see the passage of Venus across the sun. Prin work is *Geodésie de la haute Éthiopie* (Paris 1873). His brother, Arnaud Michel (1810-93), b at Dublin, travelled with him. His prin work is *Unze ans dans la haute Éthiopie* (Paris 1868) a record of the travels and observations of both.

**Abbadie, Jacques** (1654-1727) b at Nav and educated at Sedan, Summi and Puy-launs, where he graduated D.D. In 1680 he was appointed pastor of the 1st Protestant church in Berlin by Frederick William, elector of Brandenburg. During the years 1688 and 1689 he accompanied Marshal Schomberg to Holland, England and Ireland and was made pastor of the 1st church in the Savoy. In 1699 he was made dean of Killaloe by William III. He d at Marylebone, London. His chief works are *Traité de la vérité de la religion chrétienne* 1681, *Traité de la divinité de Notre Seigneur Jésus Christ* 1689, *L'art de se connaître soi-même*, 1692, *Défense de la nat on britannique*, 1692, a vindication of the revolution of 1688, *La Trandéconspiration d'Angleterre* 1696, written by the order of William III.

**Abbas** (566-632) the uncle of Mohammed. He became the chief supporter of Mohammed although he was at first opposed to him. The founder of the dynasty of the Abbasids (qv), who ruled as caliphs of Baghdad from 750 to 1258.

**Abbas I**, shah of Persia 1587-1628, known as Shah A. the Great. He was b 1557, was the son of Mohammed Mirza and grandson of Tahmasp. He defeated the Turks in Ghilan and Azerbaijan 1590, and the Usbeks near Herat 1597, honourably received Sir Anthony and Sir Robert Shirley, 1598, and in 1599

Sir Anthony was sent to the Christian princes of Europe to offer them the shah's friendship, with a view to some combination against the Turks. A. defeated the Turks in a great battle, 1603, and the Turks and Tartar of Kipchak between Sultanleah and Tabriz 1618. The Persians and Eng took Ormuz from the Portuguese 1622, and Abbas d at Cashin 1628. During his reign he encouraged commerce, promoted the prosperity of Persia, added largely to his dominions, and made Isfahan the cap of his kingdom.

**Abbas II**, shah of Persia 1641-66. He was b in 1620 and during his reign promoted the prosperity of his people and tolerated the Christians. He took Kandahar, formerly taken by A. I but lost under the Mogul domination.

**Abbas III**, shah of Persia 1732-36. He was b 1712 and crowned shah when he was only 8 months old, was the last of the Safi dynasty.

**Abbas Hilmy** (1874-1927) 1st khedive of Egypt which as A. II he ruled before the First World War, studied at Theresianum Academy, Vienna, and succeeded his father Tewfik on the throne of Egypt 1892. He at first tried to overthrow Brit rule, abolished and reduced taxes and disagreed with Lord Cromer and Lord Kitchener. Affairs were however settled when Lord Kitchener took the Egyptian Sudan 1896-98 and A. visited England 1899. He threw in his lot with Turkey in 1914, was deposed Dec 18, 1914 and the khedivate passed with the title of sultan to Hussein Kemal Pasha, his uncle. D at Vienna.

**Abbas Mirza** (1783-1833) prince of Persia, and son of Shah Feth Ali. He commanded the Persians against the Russians 1811-13 without success, concluded the peace of Erzerum with the Turks, 1823. In 1826-28 he again fought against the Russians, signing the treaty of Turkmanchai, which gave to Russia the Persian dominions in Armenia and Caucasus.

**Abbas Pasha**, Abbas I (1813-54), viceroy of Egypt 1848-54 b 1813, grand son of Mehmet Ali (Mohammed Ali). He took part in the Syrian war 1840-41, became viceroy of Egypt on the death of his uncle Ibrahim Pasha 1848 and was found dead, probably murdered 1854. He was a bad ruler and during his reign undid the good done by Mehmet Ali. However, he promoted the establishment of the railway from Alexandria to Cairo, 1851.

**Abbasids**, a family of sovereigns who occupied the throne of the Arabian empire from A.D. 750 to A.D. 1258. The name is derived from their ancestor Abbas ben Abd al Motalleb, a paternal uncle of Mohammed. They made war on the Omayyad caliphs who had occupied the throne of the Arabian empire from 661, and completely defeated them in a battle on the banks of the R. Zab, near Mosul, 750. Under Harun al Rashid (786-809) the prosperity of the Abbasid empire was very great, flourishing towns

were estab., literature and the arts were encouraged, and the splendour and luxury of the court of Bagdad are exhibited in many of the *Arabian Nights Tales*. Under Mamun (813-33) colleges and libraries were founded, and works on astronomy, mathematics, metaphysics, natural philosophy, and medicine were trans. from the Sanscrit and Gk. into Arabic. Later in the century the prosperity was broken by invasions by the Saracens and Turks, and by internal disturbances. From the time of Rhadi (939-40) almost all power had passed from the caliphs to the emirs al-Omara, and the caliphate then became a mere nominal dignity, with the possession of the tn. of Bagdad. The last caliph, Mostasem, was defeated and killed by the Mongol chieftain Hulagu, 1258, and thus ended the gov. of the A.

**Abbate, Niccolo dell'**, see **ABATI, NICCOLO**.

**Abbatess Milites, Abba-Comites, Abbi-Comites**, see under **ABBOT**.

**Abbaye**, a military prison close to the church of St.-Germain-des-Prés; was built by Gamart between 1631 and 1635, and was the scene of a terrible massacre on Sept. 2 and 3, 1792, during the Fr. Revolution, mentioned by Carlyle in *The French Revolution* (Part III. bk. i. ch. iv.).

**Abbazia**, a tn. in Istria, Italy. Its position on the bay of Fiume, and its warm climate, make it a favourite health resort. It is noted for its gardens and pretty villas. It is an airport. Pop. 2500.

**Abbé**, originally the Fr. term for abbot. Before the Fr. Revolution it was applied to many persons who had little or no connection with the church, but who acted as tutors, profs., and men of letters. 'Abbés commendataires' were persons who received revenues from their monasteries, but who were not necessarily monks.

**Abbe, Cleveland** (1838-1916), Amer. meteorologist, b. in New York. Studied astronomy at Ann Arbor and Cambridge (Massachusetts), and spent 2 years in Russia at the Pulkovo observatory. He became director of the Cincinnati observatory in 1868, and meteorologist of the weather bureau in 1891. Among his publications are: *Report on Standard Time*, 1879; *Preliminary Studies for Storm and Weather Predictions*, 1889; *The Mechanics of the Earth's Atmosphere*, vol. i. 1891, vol. ii. 1909; *Physical Basis of Long-range Forecastings*, 1902.

**Abbeokuta**, see **ABEOKUTA**.

**Abbess**, the superior of a nunnery or other female religious community. She is usually elected by the nuns subject to the approval of the bishop. In the Rom. Catholic Church an A. possesses the same dignity and exercises the same functions as an abbot, except those of confession and preaching. According to a decree of the council of Trent, it is recommended that an A. at the time of her election, should be at least 40 years of age, and should have made profession for 8 years; and it is forbidden that any

person be elected to the dignity who has not been professed for 5 years, or is under 30 years of age.

**Abbeville**, a tn. near the mouth of the R. Somme in N. France. It is an important industrial and commercial centre; manufs. woollen goods, rope, sacking; does a considerable trade in grains; and has dyeing and bleaching works. The tn. is noted for the church of St. Wolfram and for its medieval appearance. The houses are for the most part built of brick, but some old wooden ones still remain. Historically it is noted for 2 treaties which have borne its name—one between Henry III. of England and Louis IX. of France in 1259, and the other between Henry VIII. of England and Francis I. of France in 1527. The scene of fighting in the Second World War in May, 1940; the church of St. Wolfram, with its fine sixteenth-century flamboyant facade and thirteenth-century belfry, was gutted; the museum was destroyed with all its contents, and the hôtel de ville was razed to the ground (see **WESTERN FRONT IN SECOND WORLD WAR**). Afterwards, when in Ger. occupation, frequently attacked by the R.A.F. Pop. 21,000.

**Abbey** (from the O.Fr. *abate*), a religious community presided over by an abbot or abbess, a building occupied by the community, the church of a monastery, or a private dwelling-house. See **MONASTERY**.

**Abbey, Edwin Austin** (1852-1911), one of the foremost Amer. figure-painters, was b. in Philadelphia. He was sent by Harper Brothers of New York to England in 1878 to gather material to illustrate Herrick's poems. These illustrations, together with his work on Shakespeare's plays, secured his fame. From 1891 to 1902 he was engaged on a series of panels, 'The Quest of the Holy Grail', for the Boston Public Library, and in 1901 he was commissioned by Edward VII. to paint his coronation. Among his pictures may be mentioned: 'A May-Day Morning,' 'Fiammetta's Song,' 'Crusaders Sighting Jerusalem,' 'Pot-pourri,' and 'A Measure.' In 1896 he was elected A.R.A., and in 1898 he became an R.A.

**Abbeyleale**, a tn. of Limerick on the R. Feale, Ireland (Eire). Pop. 900.

**Abbeyleix**, a tn. in Leix (formerly Queen's co.), near Maryborough, Ireland (Eire). Pop. 800.

**Abbey Theatre**, Dublin, see under **DRAMA**.

**Abbiategrosso**, a tn. near Milan, Italy, on the Naviglio Grand Canal; was taken by Frederick I., 1167, and by Frederick II., 1245; pop. 15,900.

**Abbot**, the title of the head of a monastery or an abbey. The word 'abbot' or 'abbat' is derived through Syriac *abba*, from the Heb. *ab*, father. Originally the title was given as a mark of respect to any member of the clerical order, and when monastic institutions were first founded, to the head monk of the institution (not necessarily a priest). In the Gk. Church the corresponding title to A. was archimandrite (chief monk), or hegumenos (leader),

Since the sixth century monks have generally been priests. In orders founded after the tenth or eleventh century the title A. was discontinued, and superiors were known as priors, guardians, and rectors.

In dignity an A. is considered to stand next to a bishop. In England 26 As. and 2 priors (wearing the mitre and carrying the crosier) used to sit in the House of Lords. Cardinal As. were those who presided over an establishment with sev. branches, and in Germany there were prince As. as well as prince bishops. In the tenth century there were field As. (in Lat. 'Abbatēs Militēs'), and A. counts ('Abba Comites' or 'Abbi-Comites'), secular persons who rendered military service in return for certain abbeys bestowed upon them by the prince, and this practice continued in Great Britain after it had been discontinued on the Continent.

An A. is usually elected by the monks, subject to the approval of the pope or of the bishop, according as the monastery is independent or under episcopal jurisdiction. There was friction between the As. and the Church owing to an attempt by the As. to free themselves from the authority of the dioceses. Some became independent and possessed great power and wealth. Long before the Reformation, however, their power was reduced to narrow limits, and subjected in all material points to the civil authority.

**Abbot of Unreason**, Lord or Abbot of Misrule, the title of the master of Christmas revels, used respectively in Scotland and in England while *L'abbé de L'esee* (i.e. Jollity) is the Fr. equivalent. In Sir Walter Scott's *Abbot*, the falconer Adam Woodcock masquerades as A. of U. under the name of Father Howleglass.

**Abbot, Charles**, see COLCHESTER, BACON.

**Abbot, George** (1562-1633), archbishop of Canterbury, b. at Guildford, Surrey, Oct. 29, son of a cloth-worker. Educated at the grammar school, Guildford, and Balliol College. He became private chaplain to Thomas Sackville, Lord Buckhurst, chancellor of the univ., 1592; master of Univ. College, 1597, 1599; of Winchester, 1600; 3 times vice-chancellor of Oxford Univ., 1600-5; chaplain to the Earl of Dunbar, 1608; dean of Gloucester, 1609, bishop of Lichfield and Coventry, 1609; bishop of London, 1610; and archbishop of Canterbury, 1611. He was a Calvinist and opposed popery and Arminianism. A violent opposition of theological sentiment existed between him and Laud, making them political enemies and rivals. In 1621 he accidentally shot a keeper at Harringworth, but was formally pardoned by the king. He was deprived of his authority, 1627, for opposing the doctrine of passive obedience preached by Dr. Manwaring and Dr. Sibthorp; but was summoned as usual to Parliament, 1628. He was buried at Guildford. His works include: *Exposit-*

*tion on the Prophet Jonah; A Brief Description of the Whole World*, 1599.

**Abbot, George** (1603-48), son or grandson of Sir Thomas A. of Easington, Yorks. Fought on the parl. side in the civil war. He was a member of the Long Parliament for Tamworth. He wrote *Paraphrase of the Book of Job*, 1640; *Vindiciæ Sabbathi, or an Answer to Two Treatises of Mr. Broad*, 1641; and *Brief Notes upon the Whole Book of Psalms* (pub. posthumously), 1651.

**Abbot, John**, a poet, was educated at Sidney Sussex College, Cambridge, taking his degree of B.D. 1617. He wrote a poem entitled *Jesus Prefigured; or, a Poeme of the Holy Name*, 1623.

**Abbot, Robert** (1560-1617), elder brother of George A., archbishop of Canterbury, was educated at the grammar school, Guildford, and Balliol College, Oxford. He became one of the chaplains in ordinary to James I., 1603; master of Balliol College, 1609-15; fellow of Chelsea College, 1610; Regius Prof. of Divinity at Oxford, 1612; and bishop of Salisbury, 1615. He was a great preacher, and wrote theological works, including: *A Mirrour of Popish Subtillies*, 1594; *The Eccallation of the Kingdom and Priesthood of Christ*, 1601; *A Defence of the Reformed Catholicke of W. W. Perkins*, 1606; *Apologum adversus Apologiam Andree Eudemon Joannis*, 1613; and *De Suprema Polestake Regna, contra Bellarminum et Suarez*, 1619.

**Abbot, William** (1789-1843), dramatist and actor, performed at Covent Garden, 1812; played Romeo to Miss Fanny Kemble's Juliet, 1830, and Apollon Claudius and Modus in Sheridan Knowles's *Virginius* and *The Hunchback*. He wrote *Youthful Days of Frederick the Great* (1817) and *Swedish Patriotism* (1819).

**Abbotsford**, on the r. b. of the Tweed, about 2 or 3 m. to the W. of Melrose, was the home of Sir Walter Scott from 1812 until his death in 1832. It was formerly a small farm, which Scott bought in 1811. He built a villa there and called it A., and continued until 1817 to add new buildings of the old baronial style, making it a picturesque and irregular estate. There is a large collection of books, curios, and paintings. See Lockhart's *Life of Sir Walter Scott*, 1837-8.

**Abbot's Hall**, a par. near Kirkcaldy, Fifeshire, Scotland, in which canvas is manufactured. Pop. 7500.

**Abbots Langley**, a par. near Watford, England, said to be the bp of Nicholas Breakpear, Pope Adrian IV. Pop. 5500.

**Abbott, Charles**, see TENTERDEN, BARON. **Abbott, Edwin Abbott** (1838-1926), was b. in London, and was educated at St. John's College, Cambridge. He was headmaster of the City of London School, 1865-89; and Hulsean lecturer at Cambridge Univ., 1876. He was a select preacher at both Oxford and Cambridge, and the author of many works—mainly scholastic and theological. His *Shakespearean Grammar*, 1870, is an enduring contribution to Eng. philology.

His many theological works include the article on the Gospels in the ninth ed. of the *Ency. Brit.* and *The Fourfold Gospel* (in 5 parts), 1913-17.

**Abbott, Emma** (1849-91), an Amer. singer, b. at Chicago, studied music in Europe, appeared in opera at Covent Garden, and later, having formed a company of her own, toured the U.S.A. She d. at Salt Lake City.

**Abbott, Evelyn** (1843-1901), a classical writer, was educated at Balliol College, Oxford, where he became tutor and librarian, 1874. His chief works are *Elements of Greek Accidence*, with *Philological Notes*, 1874; *Index to Plato*, compiled for the Second Edition of Professor Jouett's Translation of the Dialogues, 1875; edited *Hellenica* a Collection of Essays on Greek Poetry, Philosophy, History and Religion, 1880, and *A History of Greece*, 1888-1900.

**Abbott, Jacob** (1803-79), an Amer. author, b. at Hallowell, Maine, U.S.A., and educated at Bowdoin College, where he graduated 1820, and at Andover. He entered the ministry of the Congregational Church, but he is best known by his writings—educational and religious. His first book, *The Young Christian* (1832), was followed by about 200 others, the best among which were in the 28-vol. series concerning *Hollo*, and being instructive tales for the young in the manner of Day's *Sandford and Merton*. Many of his works were pub. in England, and many have been trans. into foreign languages in Europe and Asia.

**Abbott, John Stevens Cabot** (1805-77), an historical writer, was b. at Brunswick, Maine, U.S.A. He was the brother of Jacob Abbott, and was educated at Bowdoin College and at the Theological Seminary, Andover. Associated with his brother in the preparation of a series of brief historical biographies. But he is chiefly remembered for his partisan, unscholarly, but interesting *History of Napoleon Bonaparte*, 1852-55. His other biographies are of Amer. presidents, Gen. U. S. Grant, Napoleon III., etc.

**Abbott, Lyman** (1835-1922), Amer. Congregational minister and editor, b. at Roxbury, Massachusetts. He received the pastorate of a church in 1860, and succeeded Henry Ward Beecher at Brooklyn in 1888, resigning in 1899. He became editor in-chief of the *Outlook*, 1893, and he pub. *Henry Ward Beecher*, 1883; *The Theology of an Evolutionist*, 1897; *Life and Literature of the Ancient Hebrews*, 1901; *The Great Companion*, 1904; *The Industrial Problem*, 1905; *The Home Builder*, 1908; *The Temple*, 1909; *The Spirit of Democracy*, 1910; *America in the Making*, 1911; *The Twentieth-century Crusade*, 1918; *What Christianity Means to Me*, 1921; *Silhouettes of my Contemporaries*, 1922.

**Abbottabad**, a tn. in Hazara dist., N.W. Frontier Prov., Pakistan, founded by Sir James Abbott; important military cantonment. Pop. 9000.

**Abbreviation**, in music, consists of signs or terms used to facilitate the work

of the composer and copyist. In organ music, G.O. or Gr. = Great Organ, F.O. = Full Organ, etc. In pianoforte music, L.H. or M.S. (It. *mano sinistra*) or M.G. (Fr. *main gauche*) = left hand; R.H. or M.D. (It. *mano destra*, Fr. *main droite*) = right hand; ped. = depress pedal, \* = release pedal. General A. are. ∞, pause; < or cres. = *crescendo*, get gradually louder; > or dim = *diminuendo*, get gradually softer; f = loud; ff = very loud; mf = fairly loud; p = soft; pp = very soft; mp = fairly soft. D.C. = repeat from the beginning of the movement (*da capo*). D.S. or : §, *dal segno* — repeat from previous sign : §; ten, or *tenuto* = hold, or sustain; sf, or sfz = *sforzato*, or *sforzato*, accentuate; rit. = *ritenuto*, slacken immediately in speed, rall = *rallentando*, slacken gradually in speed, accel. = *accelerando*,



ABBREVIATION IN MUSIC

quicken gradually, and so on. In full scores, the instruments are named in abbreviation, e.g. F. = flauto or flute, Fag. = fagotto, Viol. or Vo = violin, Va. = Viola, etc. Another kind of A. is shown in the illustration; for instance, in the figure above the passage A may be abbreviated into the form B, and C into that of D.

**Abbreviations**, methods by which the initial letter, the initial syllable, or a sign is made to represent a word or phrase, in order to save space and time. These methods were employed to a large extent in anct. inscriptions, (A and Rom. MSS., and documents. A. were also used in legal documents until the reign of George II, when they were discontinued. The following is a list of the most important A. used in England. (For chemical A., see ELEMENTS.)

A. A. A. Automobile Association.  
A. A. A. Amateur Athletic Association.  
A. A. A. S. American Association for the Advancement of Science.  
A. A. F. Auxiliary Air Force.  
A. A. G. Assistant Adjutant-General.  
A. A. I. Associate of the Auctioneers' Institute.  
A. A. S. (Académie Americaine Socius) Fellow of the American Academy.  
A. B. (Artium Baccalaureus) Bachelor of Arts (see B.A.).  
Able-bodied (seaman).  
A. B. C. Army Bureau of Current Affairs.  
Abp. Archbishop.  
A. B. S. American Bible Society.

A.C. (Ante Christum) Before Christ. A.C.A. Associated Chartered Accountant. Acc. or Acct. Account. A.C.C.S. Associate of Corporation of Certified Secretaries. A.C.G.I. Associate of City and Guilds Institute. A.C.I.A. Associate of Corporation of Insurance Agents. A.C.I.B. Associate of Corporation of Insurance Brokers. A.C.I.S. Associate of Chartered Institute of Secretaries. A.C.R.A. Associate of the Corporation of Accountants. A.C.S. American Colonisation Society. A.D. (Anno Domini) In the year of our Lord. A.D.C. Aide-de-Camp. Ad lib. (Ad libitum) At pleasure. Adv. Advocate. Advnt. Ad val. (Ad valorem) At, or on, the value. Advt. Advertisement. *Æ.* or *Æt.* (Ætatis) Of age, Aged. A.E.C. Army Education Corps. A.F.A.S. Associate of Faculty of Architects and Surveyors. A.F.B.S. American and Foreign Bible Society. A.F.C. Air Force Cross. A.F. of L. American Federation of Labour. A.F.S. Auxiliary Fire Service. A.G. Adjutant-General. Accountant-General. A.G.S.S. American Geographical and Statistical Society. A.H. (Anno Hegiræ) In the year of the Hegira (622 A.D.). A.H.M.S. American Home Missionary Society. A.I.A. Associate of the Institute of Actuaries, American Institute of Architects. A.I.A.A. Associates of Incorporated Association of Architects. A.I.C. Associate of Institute of Chemistry. A.I.C.A. Associate of Institute of Company Accountants. A.I.C.S. Associate of Institute of Chartered Shipbrokers. A.Inst.P. Associate of Institute of Physics. A.L. (Anno Lucis) In the year of light. Ala. Alabama. A.L.A. Associate of the Library Association. American Library Association. A.M. (Artium Magister) Master of Arts (see M.A.); (Ante meridiem) Before noon; (Anno Mundi) In the year of the world. A.M.A. American Medical Association. A.M.D.G. (Ad Majorem Dei Gloriam) To the greater glory of God. A.M.I.A.E. Associate of Institute of Automobile Engineers. A.M.I.C.E. Associate Member Institution of Civil Engineers. A.M.I. Chem.E. Associate Member Institution of Chemical Engineers. A.M.I.E.E. Associate Member Institution of Electrical Engineers. A.M.I.Mech.E. Associate Member Institution of Mechanical Engineers. Am.Soc.C.E. American Society of Civil Engineers. Anon. Anonymous. A.O.H. Ancient Order of Hibernians. A.Q.M.G. Assistant Quartermaster-General. A.R.A. Associate of the Royal Academy. A.R.A.M. Associate of the Royal Academy of Music. A.R.C.A. Associate of the Royal College of Arts. A.R.C.M. Associate of the Royal College of Music. A.R.C.S. Associate of the Royal College of Science. A.R.H.A. Associate of the Royal Hibernian Academy. A.R.I.B.A. Associate of the Royal Institute of British Architects. A.R.I.C. Associate of Royal Institute of Chemistry. Ariz. Arizona. Ark. Arkansas. A.R.P. Air Raid Precautions. A.R.R.C. Associate of the Royal Red Cross. A.R.S.A. Associate of the Royal Scottish Academy. A.R.S.M. Associate of the Royal School

of Mines. A.R.S.S. (Antiquariorum Regiæ Societatis Socius) Fellow of the Royal Society of Antiquaries. A.R.W.S. Associate of the Royal Society of Painters in Water Colours. A.S. (Anno Salvatoris or Salutis) In the year of our Saviour or of salvation. A.S.A. Amateur Swimming Association. A.S.P.C. American Society for Prevention of Cruelty. A.S.S.U. American Sunday School Union. A.T.S. Women's Auxiliary Territorial Service. American Tract Society. American Temperance Society. Att. or Atty. Attorney. Atty.-Gen. Attorney-General. A.U.C. (Anno Urbis Conditiæ, or Ab Urbe Condita) In the year of, or from the building of, the city, i.e. Rome (753 B.C.). A.U.S. Army United States. A.V. Authorised Version.

B. b. born, bowled. B.A. (Baccalaureus Artium) Bachelor of Arts (see A.B.), British America. B.Agr. Bachelor of Agriculture. Balto. Baltimore (U.S.A.). Burt. or Bt. Baronet. B.B.C. British Broadcasting Corporation. B.C. Before Christ, British Columbia. B.Ch. (or Ch.B.) Bachelor of Surgery. B.C.L. Bachelor of Civil Law. B.Com. Bachelor of Commerce. B.D. (Baccalaureus Divinitatis) Bachelor of Divinity. B.E.F. British Expeditionary Force. B.F.A. Bachelor of Fine Arts. B.L. or B.L.L. (Baccalaureus Legum) Bachelor of Laws (see LL.B.). B.M. (Baccalaureus Medicinæ) Bachelor of Medicine (see M.B.). B.M.A. British Medical Association. B.O.A.C. British Overseas Airways Corporation. Bp. Bishop. B.P. British Public. B.Sc. Bachelor of Science. B.S.L. Botanical Society, London. B.S.T. British Summer Time. B.V.M. Blessed Virgin Mary.

C. C. (Centum) A hundred (see Cent.), Conservative. Centigrade. Cantuar. Canterbury. C. or Cm. Centimetres. C.A. Chartered Accountant, Controller of Accounts. Cal. California, Calendar; (Calendæ) Calends. Canu. or Camb. Cambridge. Cant. Canticles, Canterbury. Cantab. (Cantabrigiensis) Of Cambridge. Cap. Capital; (Caput) (Chapter) Number of Act of Parliament. C.B. Comp. of the Bath. C.B.E. Commander of the Order of the British Empire. C.B.S. Confraternity of the Blessed Sacrament. C.C. County Council, County Commissioner, County Court, Crown Clerk, Contra Credit; (Compte Courante) Account Current. C.C.C. Corpus Christi College. C.C.P. Court of Common Pleas. C.D. Civil Defence. C. of E. Church of England. C.E. (Civil Engineer, Christian Endeavour. C.E.M.A. Council for the Encouragement of Music and the Arts (Pilgrim Trust). Cent. (Centum) A hundred (see C.), Centigrade. Cestr., Chester. C.F. Chaplain to the Forces. Cf. (Confer) or Cp. Compare. C.G. Commissary-General. Consul-General. Coast Guard. C.G.M. Conspicuous Gallantry Medal. C.G.S. Centimetre-gramme-second. C.H. Companion of Honour, Court-House, Custom-House. Ch. Church, Chapter. Chanc. Chancellor. Chap. Chapter. Ch. Ch. Christ Church. Chr. Christian.

C.I. Order of Crown of India. Cioestr. Chichester. C.I.D. Committee of Imperial Defence. C.I.E. Companion of the Order of the Indian Empire. C.I.F. (usually c.i.f.) Cost, Insurance and Freight. C-in-C. Commander-in-Chief. C.I.G.S. Chief of Imperial General Staff. C.I.O. Congress of Industrial Organisations (U.S.A.). C.I.V. City Imperial Volunteers (Boer War). C.J. Chief Justice. C.L.B. Church Lads' Brigade. C.M. Common Metre, Certificated Master, (Chirurgiae Magister) Master of Surgery. C.M.G. Companion of the Order of St. Michael and St. George. C.M.S. Church Missionary Society. c/o, care of. Co. Company, County. C.O. Commanding Officer, Crown Office, Colonial Office, Criminal Office. C.O.D. Cash (or Collect) on Delivery. Col. Colonel, Colonial, Colossians, Column. Coll. College, Collector, Collection, Colleague. Coll. or Collog. Colloquial. Colo. Colorado. Com. Commissioner, Commodore, Committee, Commerce, Commentary, Common. Comp. Compare, Comparative, Compound, Compounded. Compar. Comparative. Con. (Contra) Against, In opposition. Con. Cr. Contra Credit. Conn. Connecticut. Const. Constable, Constitution. Cor. Corinthians. Cor. Mem. Corresponding Member. Cor. Sec. Corresponding Secretary. C.O.S. Charity Organisation Society. Cos. Cosine. Cot. Cotangent. C.P. Common Pleas. Clerk of the Peace, Court of Probate. C.P.C. Clerk of the Privy Council. C.P.S. (Custos Privati Sigilli) Keeper of the Privy Seal. Cr. Credit, Creditor. C.R. (Custos Rotulorum) Keeper of the Rolls. C.R.P. (Calendarium Rotulorum Patentium) Calendar of the Patent Rolls. C.S. Court of Session, Clerk to the Signet; (Custos Sigilli) Keeper of the Seal; (Christ Scientist) - Christian Science Church. C.S.A. Confederate States Army. C.S.C. Conspicuous Service Cross. C.S.I. Companion of the Order of the Star of India. C.S.M. Company Sergeant-Major. C.S.N. Confederate States Navy. C.T. Certified Teacher. Ct. Connecticut, Court, Court; (Centum) A hundred. C.T.C. Cyclist Touring Club. C.T.U. Christian Temperance Union. Cts. Cents. Cur. Current (i.e. this month). C.V. Common Version. C.V.O. Companion Royal Victorian Order. Cwt. (Lat. Centum, a hundred, and Eng. weight) A hundredweight.

D. d. (denarius or denarii) A penny or pence, Duke, died. D.Agr. Doctor of Agriculture. D.B.E. Dame Commander of the Order of the British Empire. D.C. District of Columbia; (Da Capo) Again, or From the beginning. D.C.L. Doctor of Civil (or Common) Law. D.C.L.I. Duke of Cornwall's Light Infantry. D.C.M. Distinguished Conduct Medal. D.D. (Divinitatis Doctor) Doctor of Divinity. D.D.S. Doctor of Dental Surgery. Def. Defendant. Deg. Degree, Degrees. Del. Delaware, Delegate; (Delineavit) He, or she, drew it—affixed to the draughtsman's name. Dem. Democrat, Democratic. D.Eng.

Doctor of Engineering. Dep. Deputy, Department. Dept. Department, Dependent. Deut. Deuteronomy. D.F. Dean of the Faculty. D.F.C. Distinguished Flying Cross. D.F.M. Distinguished Flying Medal. D.G. (Dei Gratia) By the grace of God; (Deo Gratias) Thanks to God. Diam. Diameter. Dist. Atty. District Attorney. D.Lit. Doctor of Literature. D.L.O. Dead-Letter Office. D.N.B. Dictionary of National Biography. Do. (Ditto) The same. Dols. Dollars. D.O.M. (Deo Optimo Maximo) To God (heading of dedicatory inscriptions). D.O.R.A. Defence of the Realm Act. D.P.H. Department of Public Health. D.P.O. Distributing Post Office. Dr. Debtor, Doctor, Dram, Drams. D.Sc. Doctor of Science. D.S.C. Distinguished Service Cross. D.S.M. Distinguished Service Medal. D.S.O. Distinguished Service Order. D.T. (Doctor Theologiae) Doctor of Theology, Delirium Tremens. D.V. (Deo Volente) God willing. D.V.S. Doctor of Veterinary Surgery. Dwt. (Lat. Denarius, and Eng. weight) Pennyweight or Pennyweights.

E. E. Earl, East. E. & O.E. Errors and omissions excepted. Ebor. (Eboracum) York. E.C. Eastern Central (Postal District, London). E.C.U. English Church Union. Ed. Editor, Edition. E.D. Efficiency Decoration. E.E. Errors excepted. e.g. (exempli gratia) For example. E.I. East Indies Ency. Encyclopædia. E.N.S.A. Entertainments National Services Association. Ep. Epistle. Eph. Ephesians. Eq. Equal, Equivalent. Esd. Esdras. Esq. Esquire. Esth. Esther. et. al. (et alibi) And elsewhere; (et alii, or alia) And others. Etc. or &c. (Et cæteri, cætera, or cætera) And others, And so forth. et seq. (et sequentes or et sequentia) And the following. Ex. Example, Exception, Exodus. Exch. Exchequer, Exchange. Exor. Executor. Exor. Excutrix. Exon. (Exonia) Exeter. Exor(s). Executor(s). Ez. or Ezr. Ezek. Ezekiel. E. and O.E. Errors and omissions excepted.

F. F. Fahr. Fahrenheit. F.A. Football Association. F.A.A. Fleet Air Arm. F.A.A.M. Free and Accepted Masons. F.A.I. Fellow of Auctioneers' Institute. F.A.O. Food and Agricultural Organisation (of the United Nations). F.A.S. Fellow of the Society of Arts, Fellow of the Antiquarian Society. F.B.A. Fellow of British Academy. F.B.A.A. Fellow of British Association of Accountants and Auditors. F.B.I. Federation of British Industries. F.C.A. Fellow of the Institute of Chartered Accountants. F.C.G.I. Fellow of City and Guilds Institute. F.C.I.A. Fellow of Corporation of Insurance Agents. F.C.I.B. Fellow of Corporation of Insurance Brokers. Fcp. Foolscap. F.C.P. Fellow of the College of Preceptors. F.C.R.A. Fellow of Association of Certified and Corporate Accountants. F.D. (Fidel Defensor) Defender of the Faith. Fec. (Fecit) He did it. F.E.S. Fellow of the Entomological Society, Fellow of the

Ethnological Society. Feud. Feudal. F.F.A. Fellow of the Faculty of Actuaries. F.F.A.S. Fellow of Faculty of Architects and Surveyors. F.G.S. Fellow of the Geological Society. F.H. Fire Hydrant. F.H.S. Fellow of the Horticultural Society. F.I.A. Fellow of the Institute of Actuaries. F.I.A.A. Fellow of the Incorporated Association of Architects. F.I.A.C. Fellow of Institute of Company Accountants. F.I.C.S. Fellow of Chartered Shipbrokers. F.I.I.A. Fellow of Institute of Industrial Administration. F.Inst.P. Fellow of the Institute of Physics. F.J.I. Fellow of the Institute of Journalists. Fl. Flourished, Flemish. Fla. Florida. F.L.A. Fellow of the Library Association. F.L.S. Fellow of the Linnæan Society. F.M. Field Marshal. F.M.S. Federated Malay States. F.O. Field Officer, Foreign Office. Fo. or Fol. Folio. F.O.B. (f.o.b.) Free on board. For. Foreign. Fort. Fortification. F.P. Fire Plug. F.P.S. Fellow of the Philological Society. Fr. France, French, Franc. fr. From. F.R.A.I. Fellow of the Royal Anthropological Institute. F.R.A.M. Fellow of the Royal Academy of Music. F.R.A.S. Fellow of the Royal Astronomical Society. Fellow of the Royal Asiatic Society. F.R.C.M. Fellow of the Royal College of Music. F.R.C.P. Fellow of the Royal College of Physicians. F.R.C.S. Fellow of the Royal College of Surgeons. F.R.C.V.S. Fellow of the Royal College of Veterinary Surgeons. F.R.G.S. Fellow of the Royal Geographical Society. F.R.H.S. Fellow of the Royal Horticultural Society. F.R.Hist.S. Fellow of the Royal Historical Society. F.R.I.B.A. Fellow of the Royal Institute of British Architects. F.R.I.C. Fellow of the Royal Institute of Chemistry. F.R.S. Fellow of the Royal Society. F.R.S.A. Fellow of the Royal Society of Arts. F.R.S.E. Fellow of the Royal Society, Edinburgh. F.R.S.L. Fellow of the Royal Society of Literature, Fellow of the Royal Society, London. F.R.S.S. Fellow of the Royal Statistical Society. F.S.A. Fellow of the Society of Antiquaries. Ft. Foot, Feet, Fort. Fur. Furlong. F.Z.S. Fellow of the Zoological Society.

G. g. Grammes. Ga. Georgia. G.A. General Assembly. Gal. Galatians, Gallon. G.A.R. Grand Army of the Republic. G.B. Great Britain. G.B.E. Grand Cross, Order of the British Empire. G.C. Grand Chapter, George Cross. G.C.B. Grand Cross of the Bath. G.C.I.E. Grand Cross of the Indian Empire. G.C.L.H. Grand Cross of the Legion of Honour. G.C.M.G. Grand Cross of St. Michael and St. George. G.C.S.I. Grand Cross of the Star of India. G.C.V.O. Grand Cross of the Victorian Order. G.D. Grand Duke, Grand Duchess. Gen. Genesis, General. G.F.S. Girls' Friendly Society. G.H.Q. General Headquarters. G.L. Grand Lodge. G.M. Grand Master, George Medal. G.M.T. Greenwich Mean Time. G.O. General Order. G.O.C. General Officer Commanding. G.O.C. in C. General Officer Commanding in Chief. G.O.M. 'Grand Old Man' (Gladstone).

G.O.P. Grand Old Party (The Republican Party, U.S.A.). G.P.O. General Post Office. G.R. Georgius Rex (King George). Gr. Great, Greek, Grain, Gross, Grade (1st, 2nd, 3rd). G.S. General Secretary, General Service, Grand Scribe, Grand Sentinel. G.S.O. General Staff Officer: G.T. Good Templars, Grand Tyler.

H. H.A.C. Honourable Artillery Company. H.B.C. Hudson's Bay Company. H.B.M. His (or Her) Britannic Majesty. H.C. Herald's College. H.E. His Excellency. Heb. or Hebr. Hebrew. Hebrews. H.E.I.C. Honourable East India Company. Hf.-bd. Half-bound. H.G. Home Guard, Horse Guards. H.H. His (or Her) Highness, His Holiness (the Pope). Hier. (Hierosolyma) Jerusalem. H.I. Hawaiian Islands. H.I.H. His (or Her) Imperial Highness. H.I.M. His Imperial Majesty. H.J.S. (Hic Jacet Sepultus) Here lies buried. H.L.I. Highland Light Infantry. H.M. His (or Her) Majesty. H.M.A.S. His Majesty's Australian Ship. H.M.O.W. His Majesty's Office of Works. H.M.P. (Hoc Monumentum Posuit) Erected this monument. H.M.S. His (or Her) Majesty's Steamer, Ship, or Service. H.M.S.O. His Majesty's Stationery Office. Ho. of Rep. House of Representatives. H.P. High Priest, Horse-power, Halt-pay. H.Q. Headquarters. H.R.E. Holy Roman Empire, or Emperor. H.R.H. His (or Her) Royal Highness. H.R.I.P. (Hic Requiescit In Pace) Here rests in peace. H.S.H. His (or Her) Serene Highness. H.T. Hawaiian Territory.

I. Ia. Iowa. I.A. Indian Army. I.A.R.O. Indian Army Reserve of Officers. Ib. or Ibid. (Ibidem) in the same place. I.C.A.O. International Civil Aviation Organisation. I.C.S. Indian Civil Service. Id. (Idem) The same. Ida. Idaho. I.D.B. Illicit Diamond Buyer. I.e. (Id est) That is. I.F.S. Irish Free State (now Eire). I.G. Inner Guard. I.H.S. (erroneously) Jesus (or Jesus) Hominum Salvator. Jesus the Saviour of Men. Ill. Illinois. I.L.O. International Labour Organisation. I.L.P. Independent Labour Party. I.M. In Memoriam. Imp. Imperial; Imperator Emperor. Incog. (Incognito) Unknown. Ind. India, Indian, Indiana. I.T. or Ind. Ter. Indian Territory. In lim. (in limine) At the outset. In loc. (In loco) In its place. I.N.R.I. (Jesus (or Jesus) Nazarenus, Rex Judæorum [or Judæorum] Jesus of Nazareth, King of the Jews. Inst. Instant (the present month) In trans. (In transitu) On the passage. Intro. Introduction. I.M. Isle of Man. I.W. Isle of Wight. I.O.O.F. Independent Order of Odd Fellows. I.O.U. I owe you i.q. (Idem quod) The same as. I.R.A. Irish Republican Army. I.R.O. Inland Revenue Office. Irreg. Irregular. I.S. Irish Society. Is. or Isa. Isaiah. I.S.C. Indian Staff Corps (later Ind. Army). I.S.O. Imperial Service Order. I.T. Inner Temple, Indian Territory. It. or Ital. Italian, Italic, Italy. Itin. Itinerary. I.W.W. Industrial Workers of the World. I.Y. Imperial Yeomanry.

J. J. Justice. J.A. Judge Advocate. J.A.G. Judge Advocate General. J.C. Jesus Christ. J.D. Junior Deacon. Jer. Jeremiah. J.G.W. Junior Grand Warden. J.H.S. (see I.H.S.). Jno. John. Josh. Joshua. Jour. Journeyman, Journal. J.P. Justice of the Peace. J. Prob. Judge of Probate. Jr. Junior. J.U.D. (Jurs Utriusque Doctor) Doctor of both Laws (i.e. the Canon and the Civil Law).

K. Kan. Kansas. K.B. Knight of the Bath, King's Bench. K.B.E. Knight Commander of the British Empire. K.C. King's Counsel, Knight of Colombo. K.C.B. Knight Commander of the Bath. K.C.H. Knight Commander of Hanover. K.C.I.E. Knight Commander of the Indian Empire. K.C.M.G. Knight Commander of St. Michael and St. George. K.C.S.I. Knight Commander of the Star of India. K.G. Knight of the Garter. Kgr. Kilogrammes. K.H. Knight of Hanover. Kl. Kings. K.M. Knight of Malta. Km. Kingdom. K.M.H. Knight of Merit (Hol-tem). Knt. or Kt. Knight Bachelor. K.O.Y.L.I. King's Own Yorkshire Light Infantry. K.P. Knight of St. Patrick (Ireland). K.S.L.I. King's Shropshire Light Infantry. K.T. Knight Templar, Knight of the Thistle (Scotland). Kv. Kentucky.

L. L. London (in degrees); (Liber) Book; Liberal. L. lb. (Libra) A pound in weight. L. or £. A pound sterling. La. Louisiana. Lab. Labour, Laboratory. L.A.C. Leading Aircraftsman (or Aircraftswoman). Licentiate of the Apothecaries' Company. Lam. Lamentations. L.A.S. Lord Advocate of Scotland. Lat. Latin, Latitude. lb. (libra) Pound weight. lb.w. Leg before wicket. L.C. Lord Chamberlain, Lord Chancellor. l.c. lower case; (loco citato) In the place before cited. L.C.C. London County Council. L.C.J. Lord Chief Justice. Ld. Lord. L.D. Lady-Day, Light Dragoons. L.E.F. Liberté, Égalité, Fraternité (motto of French Republic). Lev. Leviticus. Lex. Lexicon. L.F.B. London Fire Brigade. L.G. Life Guards. L.G.B. Local Government Board. L.I. Long Island, Light Infantry. Lib. Liberal, Librarian. Linn. Linnaeus, Linnaean. Lit. Literature, Literary, Literally. Litt.D. Doctor of Literature. L. Lat. Low Latin, Law Latin. LL.B. (Legum Baccalaureus) Bachelor of Laws (see B.L. and B.L.L.). LL.D. (Legum Doctor) Doctor of Laws. L.M.S. London Midland and Scottish. L.Mus. Licentiate in Music. Lon. or Lond. London. Lon. or Long. Longitude. Lou. or La. Louisiana. L.N.E.R. London and North Eastern Railway. L.P. Lord Provost, Large Paper. L.P.S. Lord Privy Seal. L.R.A.M. Licentiate of the Royal Academy of Music. L.R.C.P. Licentiate of the Royal College of Physicians. L.R.C.S. Licentiate of the Royal College of Surgeons. L.s. Left side; (Locus Signifi) Place of the Seal. L.S.C. London Society of Composers. L.S.D. (Libra, Solidi, Denarii) Pounds, Shillings, Pence. L.T.A. Lawn Tennis Association. L.T.M. Licentiate of Tropical Medicine.

M. M. Marquis, Monsieur; (Mille) Thousand; (Meridies) Meridian, or Noon. m. Metres. M.A. Military Academy, (Magister Artium) Master of Arts (see A.M.). M.A.B. Metropolitan Asylums Board. Macc. Maccabees. M.Agr. Master of Agriculture. Maj. Major. Maj.-Gen. Major-General. Man. Manitoba. Mass. Massachusetts. Matt. Matthew. M.B. (Medicine Baccalaureus) Bachelor of Medicine (see M.B.). M.B.E. Member of Order of British Empire. M.B.W. Metropolitan Board of Works. M.C. Member of Congress, Master of Ceremonies, Military Cross. M.C.C. Marylebone Cricket Club. M.Ch. Master of Surgery. M.D. (Medicine Doctor) Doctor of Medicine. Md. Maryland. Mdle. or Mle. Mademoiselle. M.E. Methodist Episcopal, Middle English, Military or Mechanical Engineer, Most Excellent. Mc. Maine. Med. Medicine. M.E.G.H.P. Most Excellent Grand High Priest. Mem. Memorandum, Memoranda; (Memento) Remember. Messrs. or MM. (Messieurs) Gentlemen, Sirs. Meth. Methodist. M.F. Master of Forestry. M.F.G.B. Miners' Federation of Great Britain. M.F.H. Master of Foxhounds. Mg. Milligrammes. Mgr. Monsignor. M.I.C.E. Member of the Institute of Civil Engineers. Mich. Michigan, Michaelmas. Mid. Middle (voice), Midshipman. Mil. Military. Min. Minute, Minutes, Mineralogy. Minn. Minnesota. Min. Plen. Minister Plenipotentiary. Miss. Mississippi. M.L.A. Member of the Legislative Assembly. MM. (Messieurs), Gentlemen or Sirs, Their Majesties. Mme. Madame. Mo. Missouri, Month. Mod. Modern, Moderate. M.O.H. Medical Officer of Health. Mon. Monmouth. Mont. Montana. M.P. Member of Parliament. M.P.P. Member of Provincial Parliament (Canada). M.P.S. Member of the Pharmaceutical Society. M.R. Master of the Rolls. M.R.A.S. Member of the Royal Asiatic Society, Member of the Royal Academy of Science. M.R.C.C. Member of the Royal College of Chemistry. M.R.C.P. Member of the Royal College of Physicians. M.R.C.S. Member of the Royal College of Surgeons. M.R.C.V.S. Member of the Royal College of Veterinary Surgeons. M.R.I. Member of the Royal Institute. M.R.I.A. Member of the Royal Irish Academy. M.S. (Memorie Sacrum) Sacred to the Memory of. MS. Manuscript. M.Sc. Master of Science. MSS. Manuscripts. Mt. Mount, Mountain. Mts. Mountains. Mus. Music, Museum. Mus. Bac. Bachelor of Music. Mus. D. or Mus. Doc. Doctor of Music. M.V.O. Member of Victorian Order. M.W.B. Metropolitan Water Board. Myth. Mythology.

N. N. Note, Name, Noun, Neuter. N.A. North America. N.A.A.F.I. Navy, Army and Air Force Institute. Nat. Natural, Natal, National. Nat. Hist. Natural History. Naut. Nautical. N.B. North Britain, North British, New Brunswick; (Nota bene) Note well, or Take notice. N.C. North Carolina, New Church. N.C.O. Non-commissioned Officer. N.D. North Dakota. n.d. No date. N.D.L.



Norddeutscher Lloyd (North German Lloyd S S Co.) NT New England N E A National Educational Association Neb Nebraska Neg Negative Nch Nehemiah Nem Con (Nemine Contradictente) No one contradicting Neth Netherlands Neut Neuter Nev Nevada NF Newfoundland N F S National Fire Service NG National Guard (U S A) NH New Hampshire, New Haven NJ New Jersey NI (Non liquet) It appears not The case is not clear NL or N Lat North Latitude NIC National Liberal Club NM New Mexico No (Nuncio) Number NO New Orleans Non Nominative Non coin Non commissioned Officer Non coin Non content, i.e. dissentient (House of Lords) Non obst (Non obstante) Notwithstanding Non pros (Non prosequitur) He does not prosecute, a judgment entered against the plaintiff when he does not appear to prosecute Non seq (Non sequitur) It does not follow. Nor Norman Nor fr Norman French Nos Numbers NP Notary Public NPD North Polar Distance NRA National Recovery Administration (U S A) NS Nova Scotia New Style (after the year 1752) Nur Islamic Society, (Notre Seigneur) Our Lord NSIC (Notre Salvator Jesus Christus) Our Saviour Jesus Christ (Notre Seigneur Jesus Christ) Our Lord Jesus Christ NSPCC National Society for the Prevention of (rue)lty to children NSW New South Wales NT New Testament NU Name or names unknown Num or Nums Numbers NUC National Union of Clerks NUR National Union of Railwaymen NUL National Union of Teachers NVM Nativity of the Virgin Mary NW 1 North West Territory NY New York NYK Nippur Yusen kusha (S S Co.) NZ New Zealand O O Ohio Old Ob (Obit) Died Obs Observatory Obsolete Observation OBE Officer of the British Empire OC Officer (commanding) OFD Oxford English Dictionary OF Odd Fellows OHG Old High German OKA Oklahoma OIMS On His (or Her) Majesty's Service OK All correct OM Old Measurement, Order of Merit Ont Ontario Op Opposite OI Out of print, Opposite Prompter Ore Oregon OS Old Style (previous to 1752) Out of stock OSB Order of St Benedict OSE Order of St Francis OI Old Testament OTC Officers Training Corps OUDS Oxford University Dramatic Society Oxon (Oxonia) Oxford (Oxonien(sis)) Of Oxford Oz Ounce or Ounces

P, P President Prince p Page Participle, P A Press Association P & O Peninsular and Oriental (Steam Navigation Co.) Pa Pennsylvania Pa Parliamt Parliamentary Part, Participle Pass Passive PAYF Pay as you earn (Income Tax) Payt Payment PC Privy Council or Councillor, Police Constable, (Patric Conscripti) Conscript Fathers Pd Paid PE Protestant Episcopal PI I Prince Edward Island

PEN (Club) Poets, Playwrights, Essay ists, Editors, and Novelists Penn Pennsylvania Pent Pentecost Per an (Per annum) By the year Per cent or Per ct (Per centum) By the hundred Perp Perpendicular PG Past Grand Paying guest Plar Pharmacy Pb B (Philosophiæ Barcalaureus) Bachelor of Philosophy Ph C Pharmaceutical (chemist) Ph D (Philosophiæ Doctor) Doctor of Philosophy Ph G Graduate in Pharmacy Phil Philipina Philo sophy Philosopher Philosophical Phile mon Phila Philadelphia Phys Physics Physiology PI Philippine Islands (U S A) Pk Peck PL Poet Laureate Pl Place, Plural PLA Port of London Authority PLC Poor Law Commissioners PM Postmaster, Past Master Past Midshipman, (Post Motem) After death pm post meridiem PMG Postmaster General Pnxr or Pxt (Pinxit) Painted PO Post Office, Postal Order P O O Post Office Order Pop Population Popularity Port Port ugal Portuguese pp Pages p p per pro Per procuratorem PP Parish Priest (Pater Patriæ) Father of his Country IPC (Pour Prendre Congé) To take leave Ppl Pamphlet PQ Province of Quebec Previous Question P Priest Prince Price PR Prize Ring Proportional Representation Porto Rico (Populus Romanus) The Roman people PRA President of the Royal Academy PRC (Post Romanum Conditum) From the building of Rome Preb Prebendary Prof Prefix PRIBA President of the Royal Institute of British Architects Print Printing Prof Professor 110t Protestant Pro tem (Pro tempore) for the time being Prov Proverbs Pro verbally, Provost, Province Provincial Prox (Proximo) Next, or of the next month PRS President of the Royal Society PS Permanent Secretary Principal Sovereign Privy Seal (Post scriptum) Postscript Ps Psalm, Psalms Pt Int, Payment, Point, Part PTO Please turn over Pub Public Published Publisher Pub Doc Public Documents PWD Public Works Dept Q Q Question, Query Queen, QB Queen's Bench QC Queen's Counsel Queen's College Qd (Quasi dicat) As if he should say Qc (Quod est) Which is OFD (Quod I rat Demonstrandum) Which was to be demonstrated QEF (Quod Erat Iacendum) Which was to be done QII (Quod I rat Invenidum) Which was to be found out QI (Quantum libet) As much as you please Qm (Quomodo) By what means QM Quartermaster QMAAC Queen Mary's Army Auxiliary Corps Q Mess Queen's Messenger QMG Quartermaster General QP or qpl (Quantum placet) As much as you please Qi Quarter (28 pounds), Farthing, Quire QS Quarter Sessions QS Quarter section (Quantum sufficit) A sufficient quantity Qt Quart Quantity Qn Queen Question Qu or Quar Quarterly Qu or Qy (Quare) Query Quo Province of Quebec Qucs Question

## Abbreviations

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## Abbreviations

Q.v. (Quod vide) Which see; (Quantum vis) As much as you will.

R. R. Railway, Road, Rod, Rises, River, Read, Resides; (Rex) King; (Regina) Queen; (Recipe) Take. R.A. Royal Academy or Academician, Royal Artillery, Rear Admiral, Right Ascension, Royal Arch, Royal Arcanum. R.A.C. Royal Arch Chapter, Royal Automobile Club, Royal Armoured Corps. R.A.E.C. Royal Army Education Corps. R.A.F. Royal Air Force. R.A.M. Royal Academy of Music. R.A.M.C. Royal Army Medical Corps. R.A.O.C. Royal Army Ordnance Corps. R.A.C.S. Royal Army Service Corps. R.A.V.C. Royal Army Veterinary Corps. Rad. (Radix) Root, Radical. R.B.A. Royal Society of British Artists. R.C. Roman Catholic. R.C.N.C. Royal Corps of Naval Constructors. R.C.P. Royal College of Physicians. R.C.R. Royal Canadian Regiment. R.C.S. Royal Corps of Signals. R.D. Refer to drawer (banking). Royal Dragoons, Rural Dean. R.D.I. Royal Designer for Industry. R.D.S. Royal Dublin Society. R.E. Royal Engineers, Royal Exchange, Right Excellent. Rec. or R. Recipro. Recd. Received. reept. Receipt. Rec. Sec. Recording Secretary. Rect. Rector, Receipt. R.F. Royal Fusiliers. Ref. Reformed, Reformer, Reformation, Reference. Ref. Ch. Reformed Church. R.E.M.E. Royal Electrical and Mechanical Engineers. R.F.A. Royal Field Artillery. Reg. Register, Registrar, Regular. Reg. Prof. Regius Professor. Rem. Remark, Remarks, Remainder. Rep. Representative, Republic, Report, Reporter. Rtd. Returned. Rev. Revelation, Reverend, Revolution, Review, Revenue, Revise. R.F. (République Française) French Republic. R.F.U. Rugby Football Union. R.G.A. Royal Garrison Artillery. R.H.A. Royal Hibernian Academy, Royal Horse Artillery. R.H.G. Royal Horse Guards. R.I. Rhode Island. R.I.B.A. Royal Institute of British Architects. R.I.C. Royal Irish Constabulary. R.I.P. (Requiescat in pace) May he rest in peace. R.L.S.S. Royal Life Saving Society. R.M. Royal Marines, Royal Mail, Resident Magistrate. R.M.A. Royal Military Asylum, Royal Marine Artillery. R.M.L.I. Royal Marine Light Infantry. R.M.S. Royal Mail Steamer. R.N. Royal Navy. R.N.A.S. Royal Naval Air Service. R.N.D. Royal Naval Division. R.N.R. Royal Navy Reserve. R.N.V. Royal Navy Volunteers. R.N.V.R. Royal Naval Volunteer Reserve. R<sup>o</sup> (Recto) Right-hand page. R. of O. Reserve of Officers. R.P. (Respublica) Republic. R.R. Railroad. R.R.C. Lady of Royal Red Cross. R.s. Right side. R.S.A. Royal Scottish Academy. R.S.E. Royal Society of Edinburgh. R.S.F.S.R. Russian Soviet Federative Socialist Republic (of U.S.S.R.). R.S.M. Royal School of Mines. R.S.P.C.A. Royal Society for the Prevention of Cruelty to Animals. R.S.V.P. (Répondez, s'il vous plaît) Answer, if you please. Rt. Hon. Right Honourable. R.T.R. Royal Tank Regiment. R.T.S.

Religious Tract Society. R.V. Revised Version. R.W. Right Worthy. Right Worshipful. R.W.D.G.M. Right Worshipful Deputy Grand Master. R.W.G.H. Right Worthy Grand Representative. R.W.G.S. Right Worthy Grand Secretary. R.W.G.T. Right Worthy Grand Treasurer, Right Worshipful Grand Templar. R.W.G.W. Right Worthy Grand Warden. R.W.S. Royal Society of Painters in Water Colours. Ry. Railway. R.Y.S. Royal Yacht Squadron.

S. S. South, Saint, Signor, Second (time), Shilling, Sun, Sets, See, Solo, Singular, Son. S.A. South Africa, South America, South Australia, Salvation Army. Sam. Samuel. San. or Sanc. Sanscrit. S.A.R. Sons of the American Revolution. Sask. Saskatchewan. Sax. Saxon, Saxony. S.C. South Carolina; (Senatus Consultum) A decree of the Senate. Sc. (Scilicet) To wit, namely; (Sculpsit) He or she engraved it. S. caps. Small capitals. Sch. (Schoolum) A note. Sch. or Schr. Schooner. Sci. Science. Slav. Slavonic. Scot. Scotland, Scottish. Script. Scripture, Scriptural. Sculp. or Sculpt. Sculpture. S.D. Senior Deacon, South Dakota. S.D.F. Social Democratic Federation. Sec. Secretary, Second, Section. Sec. Leg. Secretary of Legation. Sen. Senate, Senator, Senior. Sep. or Sept. September, Septuagint. Seq. (Sequens or Sequentia) The following, the next. Serg. or Serj. Sergeant or Serjeant. S.F. San Francisco. Sh. Shilling. S.I. Staten Island (U.S.A.). Sin. Sine (Trigonometry). Sing. Singular. S. J. Society of Jesus. Skt. Sanskrit. S. Lat. South Latitude. S.M. State Militia, Short Metre, Sergeant-Major; (Sa Majesté) His (or Her) Majesty. S.M.I. (Sa Majesté Impériale) His (or Her) Imperial Majesty. Soc. Society. S. of S. Secretary of State, Sol. Solution. Sol. - Gen. Solicitor-General. S O S. (Wireless signal of distress). S.O.S.B.W. Society for the Oversea Settlement of British Women. Sp. Spain, Spanish, Spirit. S.P. (Sine Prole) Without issue. S.P.C.K. Society for Promoting Christian Knowledge. S.P.G. Society for the Propagation of the Gospel. S.P.Q.R. (Senatus Populusque Romanus) Senate and People of Rome. Sq. Square. Sq. cm. Square centimetres. Sq. ft. Square feet. Sq. in. Square inches. Sq. yds. Square yards. S.S. Sunday School, Saint Simplicius (the mark on the collar of the Chief Justice of England), Steamship. S.S.C. Solicitor of Supreme Court. St. Saint, Street, Stone, Strait. S.S.R. Soviet Socialist Republic. S.T.D. (Sacra Theologiae Doctor) Doctor of Divinity. Ster. or Stg. Sterling. S.T.P. (Sacra Theologiae Professor) Professor of Theology. Subj. Subjunctive. Subst. Substantive, Substituto. Suff. Suffix. Sup. Superior, Supplement, Superfine, Superlative, Supp. Supplement. Supt. Superintendent. Surg. Surgeon, Surgery. S.v. (Sub verbo) Under the word, or title. Sw. Swedish, Sweden. Switz. Switzerland. Syn. Synonym, Synonymous. Synop. Synopsis. Syr. Syria, Syriac.

T. T. Tenor, Town, Township, Ton;

(Tutti) All together. T.A. Territorial Army. Tal. qual. (Talis qualis) Just as they come, average quality. Tan. Tangent. T.C. Thames Conservancy. Ten. or Tenn. Tennessee. Tex. Texas. Text. Rec. (Textus Receptus) Received Text. Thess. Thessalonians. T.H. Territory of Hawaii (U.S.A.). T.H.W.M. Trinity High Water Mark. T.O. Turn over. t. & o. taken and offered. T.N.T. Trinitrotoluene. Toc H. (Talbot House). Tom. Toime, or volume. Tonn. Tonnage. Topog. Topography. Topographical. Tr. Translation. Translator. Transpose. Trans. Transactions, Translated, Translation, Translator. T.S. Theosophical Society. T.U.C. Trades Union Congress.

U. U. Unionist. U.C. (Urbs Con-dita) Year of Rome. U.C.V. United Confederate Veterans. U.D.C. Urban District Council, Union of Democratic Control. U.E.C. United Free Church. U.K. United Kingdom. Ult. (Ultimo) Last or of the last month. U.N.E.S.C.O. United Nations Educational, Scientific, and Cultural Organisation. Unit. Unitarian. Univ. University, Universally. U.N.O. United Nations Organisation (properly, United Nations). U.N.R.R.A. United Nations Relief and Rehabilitation Organisation. U.P.C. United Presbyterian Church. u.s. (ut supra, uti supra) As above. U.S. United States, United Service. U.S.A. United States of America. U.S.N. United States Navy. U.S.S. United States Ship. U.S.S.R. Union of Soviet Socialist Republics. U.S.V. United States Volunteers.

V. V. Verb. Verse, Vocation, Volume, Viscount; (Vide) See; (Versus) Against. V.A. Vice-Admiral, Victoria and Albert Order. Va. Virginia. V.A.D. Voluntary Aid Detachment. V.C. Vice-Chancellor. Vice-Chairman, Victoria Cross. V. def. Verb defective. Verb. sap. (*Verbum sapienti sat est*) A word to the wise is enough. V.G. Vicar General; (Verbi Gratia) For example. V.i. Verb intransitive. Vid. (Vide) See. Viz. (Videlicet) Namely, to wit. Vo. (verso) Left-hand page. V.O. Victorian Order. Voc. Vocative. Vol. Volume. Vols. Volumes. V.P. Vice-President. V.S. Veterinary Surgeon. Vt. Vermont. V.t. Verb transitive. Vulg. Vulgate.

W. W. West, Week. W.A. Western Australia. W.A.A.C. Women's Army Auxiliary Corps. W.A.A.F. Women's Auxiliary Air Force. Wash. Washington. W.C.T.U. Women's Christian Temperance Union. W.E.A. Workers Educational Association. w.f. Wrong fount. W.F.L. Women's Freedom League. Whf. Wharf. W.I. West Indies. Wis. Wisconsin. W.L.A. Women's Land Army. W. Long. West Longitude. W.M. Worshipful Master. W.O. War Office. W.P. Weather permitting. Wp. Worship. W.R.A.C. Women's Royal Army Corps. W.R.A.F. Women's Royal Air Force. W.R.N.S. Women's Royal Naval Service. W.S. Writer to the Signet. Wt. Weight. W.T.S. Women's Transport Service. W. Va. West Virginia. W.V.S. Women's Voluntary Services. Wyo, Wyoming.

X. X. or Xt. Christ. Xm. or Xmas. Christmas. Xn. or Xtian. Christian. Xnty. Christianity.

Y. Y. or Yr. Year. Y.B. Year Book. Yd. Yard. \*Yc. Thee. \*Ym. Them. Y.M.C.A. Young Men's Christian Association. \*Yb. Then. Y.P.S. Young People's Society. \*Yr. Their. Yr. Your. Yrs. Yours. \*Ys. This. \*Yt. That. Y.W.C.A. Young Women's Christian Association.

For Classical A., see Grævius's *The-saurus Antiquitatum* (1694); Mommsen's *Corpus Inscriptionum Latinarum* (1863); Alph. Chassant's *Paleographie* (1854), and Campelli's *Dizionario di Abbreviature* (1899). See also DIPLOMATICS and PALEO-GRAPHY.

Abbreviator is more particularly used for an officer of the Court of Rome, appointed as assistant to the vice-chancellor for drawing up the pope's briefs and reducing petitions, when granted by the pontiff, into proper form for being converted into bulls. The As. are supposed by Ciampini to be the successors either of the *cancellarii* of the imperial household or of the *7 notarii* said to have been placed by Pope Clement I. in the 7 quarters of Rome, to write down the acts of the martyrs within their sev. dists. They are said to have taken their name either from their writing the *brevia* or shorter epistles of the pope, or from making use of notes or abbreviations in writing. A. is also a name given by some authors to an anct. literary academy supposed to have been at Rome in the fifteenth century and composed of the chief men of letters of the age, as Pomponius Lætus, Platina, Pontanus, Sannazarius, Sabellicus, etc., who, by the rule of the society, latinized their names as a condition of their admission, but the existence of such an academy is doubtful.

Abbi. Thomas (1738-87), a Ger. author, b. at Ulm; studied at Halle. Appointed prof. of philosophy, in 1760, at Frankfurt, and of mathematics at Renteln, Westphalia; one of the creators of modern Ger. prosa. There is a biography by C. F. Nicolai, 1767.

Abdalattif, an Arabian physician and writer, b. at Bagdad 1162 A.D. Held professorships at Mosul, Damascus, and Cairo, and at the latter place wrote in 1203 a *Compendium of the History of Egypt*. The titles of 166 works by Abdalattif have been recorded, about one-fourth of which are on medical subjects.

Abdallah III, see AL-MAMUN.

Abd-el-Kader (1807-83), Algerian patriot and hero of the long struggle against the Fr. This he commenced at Oran in 1833, and with varying fortune sustained till he surrendered to General de Lamoricière in 1847. He displayed great skill and perseverance in his conduct of the campaign and in 1834 he compelled the Fr. Gen. Desmichels to

\* The Y is a corrupt representation of the Anglo-Saxon þ, or th.

recognise his authority in a treaty. On a resumption of hostilities he inflicted a serious defeat on a large Fr. army at Makta, but he was driven to seek refuge in Morocco in 1843. After his final capture he was released by Louis Napoleon in 1852, and received a pension of 100,000 francs. In retirement at Damascus he wrote a book on the consolations of philosophy under the title *Rappel à l'intelligent: avis à l'indifférent*, 1858, and supplied commentaries to N. J. E. Daumas's *Chevaux du Sahara*, 1854. See A. Bellemare's *Abd-el-Kader*, 1863; C. H. Churchill's *Life of Abd el Kader*, 1867.

**Abdel-Khalek Pasha Sarwat**, see SARWAT PASHA.

**Abd-el-Krim** (b. 1881), leader of Rifs in the Moroccan campaigns 1921 and 1925. The son of a tribal chieftain, and a man with some pretensions to culture, he was, in the heyday of his brief career of military adventure, an able leader and an adept in the arts of intrigue. During the First World War he was in the Sp. service and engaged in helping the Sp. authorities to consolidate their hold on their Treaty zone. Later, however, he turned against his Sp. masters and strove to incite the Rifs against the invader. So successful was he in the field, notably near Melilla, where he almost exterminated an army of some 20,000, that he produced an upheaval in Spain, with the result that a military dictatorship was estab. to cope with the situation. In 1925 he launched an offensive against the Spaniards, this really being his only course when the Fr. had joined the latter. Previously Gen. Primo de Rivera, the Sp. dictator, had offered to make peace on terms very favourable to the Rifs, but the offer was refused by A. K., who wanted nothing less than complete independence. Ultimately he was forced to abandon the struggle through the defections of the tribesmen, who, though unbeaten in their inaccessible fastnesses, had grown tired of fighting, and in May 1926 he surrendered unconditionally to the Fr. Moroccan commander at Fez and was exiled to the Mascarene Is. When being brought to France in 1947, he escaped to Egypt.

**Abd-el-Rahman**, Moorish chief, invaded Gaul in 731 at the head of the largest Mohammedan army which had yet menaced Christendom. He was defeated and slain by Charles Martel at Tours. Abd-el-Rahman I. founded in 755 at Cordova the Umayyad dynasty of Sp. caliphs. The second caliph of this name, 822-52, was a great patron of learning, and under the third, 912-61, the Cordova caliphate attained its most brilliant period. The fourth was killed in battle near Granada, 921, and the last monarch of the name was assassinated in 1023. See MOORS IN SPAIN.

**Abdera**, tn. in Thrace, the bp. of such distinguished men as the philosopher Democritus and the historian Hecataeus, nevertheless its inhab. had a reputation for stupidity, and 'Abderite' became a term for a simpleton.

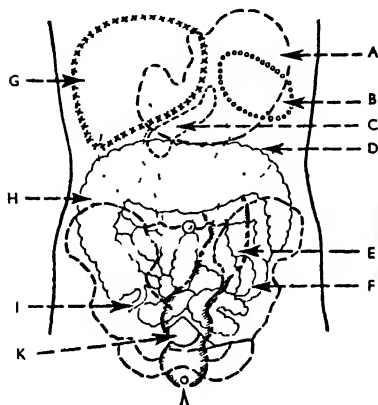
**Abdication**, the voluntary renouncing and giving up of an office by a ruler or sovereign. The essential characteristic of A. is that it is *voluntary*, but it is generally the result of internal or external pressure upon the holder of office. In a few striking instances office has been relinquished in the plenitude of power owing to a desire for the freedom of private life, as was the case with the Rom. dictators Cincinnatus, B.C. 438, Sulla, B.C. 80, and the Rom. emperor Diocletian, A.D. 305. One monarch, Philip V. of Spain, who abdicated (1724) in favour of his son, resumed the royal functions after his son's death. Other notable As. in more modern times are: Isabella II. of Spain, June 25, 1870; Amadeus I. of Spain, Feb. 11, 1873; Prince Alexander of Bulgaria, Sept. 7, 1886; Milan of Serbia, Mar. 3, 1889; Oscar of Norway, Oct. 27, 1905; Abdul Hamid II. of Turkey, Apr. 27, 1909; Manoel of Portugal, Oct. 4, 1910. The emperor Pu-yi of China not only abdicated (Feb. 12, 1912), but by a final decree converted China from an absolute autocracy into the largest republic in the world. According to Blackstone, no Eng. sovereign may abdicate without the consent of parliament. This was done in the case of James II. (1688), who was declared by a joint sitting of both houses to have abdicated.

The As. during or after the two world wars were: Nicholas II. of Russia, 1917 (see RUSSIAN REVOLUTION), Ferdinand (of Bulgaria), 1918; William II. of Germany, 1918; Nicholas of Montenegro left his country in 1916 and was dethroned in 1918; Constantine of Greece, 1917 (restored 1920), abdicated finally, 1922; Karl of Austria, 1918; Mohammed VI. of Turkey, 1922; George II. of Greece, 1924 (restored 1930); Hussein, king of the Hejaz, 1924; Ali, king of the Hejaz, 1925; Amanullah of Afghanistan, 1929; Michael of Rumania, 1930 (restored 1940) and 1948; Alfonso XIII. of Spain, 1931; Prajadhipok of Siam, 1935; Edward VIII. of Great Britain, 1936; Zog I. of Albania, 1939; Charles II. (Carol) of Rumania, 1940; Peter II. of Yugoslavia, 1943; Simeon of Bulgaria, 1946; Wilhelmina of the Netherlands, 1948. The position of Leopold of Belgium, who capitulated to the Gers. (May 28, 1940), is undetermined.

When the Allies entered Rome in 1944 King Victor Emmanuel 'retired' in favour of his son, Prince Umberto, who assumed the title of 'Lieutenant-General of the Realm.' The king remained head of the House of Savoy, and kept the title of king of Italy. In 1946, however, a referendum showed that a majority of voters were republican, with the result that Prince Umberto had no option but to retire into exile.

**Abdomen**, that part of the body separated from the thorax by the diaphragm, enclosed by the lower ribs and muscles of the belly, and supported by the pelvis. The diaphragm is a partition of membrane and muscle with a movement determining the action of the lungs

in breathing. The whole abdominal cavity is lined by a membrane called the *peritoneum*, which is the seat of the inflammation known as *peritonitis*. The term abdominal cavity lends itself to a possible misunderstanding, as it is most economically packed with a number of organs which are concerned in the nutrition of the body, and whose relative positions are adjusted by a system of enclosing muscles. If these muscles are not properly co-ordinated, the contents of the cavity are liable to protrude through the abdominal wall, giving rise to a *hernia*, or *rupture*.



REGIONS OF THE ABDOMEN

A, stomach; B, spleen; C, pancreas; D, kidney; E, rectum; F, small intestine; G, liver; H, large intestine; I, appendix; K, bladder.

Of the organs themselves, it is unnecessary in this place to do more than indicate the position of the more important. The stomach is situated in the upper part of the A., with the liver in front, and the kidneys, pancreas, and spleen behind. From the stomach, the intestines, with a total length of about 25 ft., lead to the rectum.

Serious disease within the A. is now often investigated and treated by opening the muscular wall, the operation being attended with comparatively little danger if proper precautions against septic poisoning are possible. In cases of wounds penetrating the A., particularly under unhealthy conditions of climate, it is more usual to avoid surgical measures, unless dangerous internal bleeding makes it advisable to suture, or stitch up, the bowel or intestine.

**Abduction.** In anct. legal codes the word implied the unlawful taking away of a free person, or a slave of another person. Under the Rom. criminal law the word *plagium* stood for the buying of a free person, and the term is still used in Scotland for the theft

of a child. In Eng. law, A. technically means the taking away by force, fraud, or persuasion of a woman (or child) against her own will, or, if the woman be under 21, against the will of her parents or guardians. The term is also applied under the Corrupt and Illegal Practices Act, 1883, to the action of preventing the free exercise of the franchise of any elector. The common forms of the crime are defined by the Criminal Law Consolidation Act, 1861, and the crime is also dealt with in the Criminal Law Amendment Act, 1885. The more serious forms of the offence, the A. of women, are held to be a felony, and the heavy penalty of 14 years' imprisonment may be inflicted. It is also a misdemeanour punishable by a term of 2 years' imprisonment to take a girl under 18 for the purpose of seduction, provided there were no reasonable grounds for supposing the girl to be above 18. The abduction of children under 14 is technically called 'child-stealing,' and is an offence punishable by a maximum term of 14 years' penal servitude, but the mother of a child or the father of an illegitimate child cannot be indicted. A. must not be confused with *kidnapping* (q.v.). The latter includes the theft of any person, but is more properly applied to taking away beyond the seas—so that the person loses the protection of his country's laws. Throughout the U.S.A. A. is a felony, and in some states is punishable by a fine, not exceeding 10,000 dolars, or by solitary confinement at labour for a term not exceeding 25 years.

**Abdul-ahî-el-Taachi**, or **Abdullahi ibn sayid Mohammed** (c. 1850–99), 'Khalifa,' follower of the Mahdi, Mohammed Ahmed, succeeded him in 1885. He was defeated by Kitchener at Omdurman in 1898, and killed at the battle of Om Dabrikat in 1899.

**Abdul Asiz** (III. of Nejd) **ibn Sa'ud**. See SA'UD, ABDUL ASIZ IBN.

**Abdul-Aziz** (1830–76), sultan of Turkey, succeeded his brother, Abdul Medjid, in 1861. His reign was one long struggle against revolt: Bosnia, Herzegovina, Crete, Rumania, and Serbia all rising against his misgovernment. He was deposed May 30, 1876, and found dead 4 days later.

**Abdul-Hamid I.** (1725–89), sultan of Turkey, came to the throne 1774. His reign was signalised by the struggle with Russia and Austria. The former wrested from him the Crimea in 1783, and the latter inflicted a crushing defeat on him at the battle of Ochakov (1788).

**Abdul-Hamid II.** (1842–1918), sultan of Turkey, succeeded in 1876, on the deposition of his brother, Murad V., and was himself deposed in 1909. In his reign occurred wars with Serbia (1876), Russia (1877–78), Greece (1897). The Armenian atrocities (1894–96) earned him the titles 'Great Assassin' (Gladstone), and 'Abdul the Damned' (poem by Sir Wm. Watson). The revolution of the 'Young Turks,' which deposed him estab. parl. gov. in Turkey. He was kept prisoner in Salonika till it was taken

by the Gks. in 1912, when he was removed to Constantinople. In 1915 he was transferred to Magnesia near Smyrna, where he d. Feb. 10, 1918.

**Abdul-Medjid** (1823-61), the 'Grand Sultan' of Turkey, succeeded to the throne (1839) 8 days after the disastrous defeat of his father's (Mahmud II.) army at Nisib by Mehemet Ali, the rebellious viceroy of Egypt. The intervention of the Christian powers checked the advance of the victorious Egyptians on Constantinople, and thus saved the Ottoman dynasty. The treaty of 1841, imposed on both parties by the European powers, settled the relationship of Egypt to Turkey. This sultan instituted many reforms, the rights of person and property being, *inter alia*, secured to all his subjects irrespective of their creed. The Crimean war between England and France on the one hand, and Russia on the other, arose from Russia's claim to a protectorate over his Orthodox subjects.

**Abdullah el Hussein**, first king of Transjordan (b. 1832), b. in Mecca, second son of Hussein ibn Ali, who was sheriff of Mecca and later king of the Hejaz (see **HUSSEIN**). A's elder brother was King Ali and his younger brothers were King Faisal (q.v.) and the Amir Zaid. Under his father Hussein, A. commanded the E. Army during the First World War, and accepted the surrender of the Turkish garrisons of Medina and Taif. Later, he was King Hussein's minister of foreign affairs. He arrived in Transjordan in 1921 and by arrangement with the Brit. Gov. set up a unified administration. This administration received formal recognition under an agreement (signed in 1928) between His Britannic Majesty and His Highness the Amir A., which recognised the existence of an independent gov. in Transjordan, while reserving to His Majesty powers enabling him to fulfil his international obligations and to ensure that the ter. was governed constitutionally. Until 1946 Transjordan was under the same Brit. mandatory rule as Palestine, the high commissioner for Palestine being also high commissioner for Transjordan. An ann. subsidy of £60,000 was paid by the Brit. Gov. to the amir. On March 22, 1946, the mandate for Transjordan was abrogated and a new treaty signed with Britain. This is a treaty of friendship and alliance in which Great Britain recognises Transjordan as a fully independent state and A. as its sovereign. Each party to the treaty undertakes not to adopt in foreign countries an attitude inconsistent with the alliance—a close alliance in consecration of their friendship, their cordial understanding, and their good relations.' On May 26, 1946, the Amir A. was crowned the first king of Transjordan at a ceremony in Amman (q.v.) which was attended by Gen. Sir Alan Cunningham, high commissioner of Palestine, and delegations from Syria, the Lebanon, Egypt, Palestine, and Iraq. When Arab forces invaded Palestine in 1947-48 A. led the Transjordan Frontier Force. See further under **TRANSJORDAN**; **PALESTINE**.

**Abd-ur-Rahman** (1778-1859), sultan of Morocco, reigned from 1823 to 1859. Much of his time was occupied in putting down internal insurrection. It was during his reign that the practice was abandoned of European states paying a tribute for protection against the piracy of the Moors.

**Abd-ur-Rahman Khan** (either 1830 or 1841-1901), amir of Afghanistan from 1880. Supported successfully for a while the claim of his father, Afzul, against his uncle, Shere Ali, but in 1868 had to take refuge in Russian Turkestan. Finally he overcame the son of Shere Ali, Yakub Khan, and firmly estab. himself as amir. He was eminently friendly to Great Britain, and did much to consolidate his power and to promote the social welfare of his country.

**Abecedarians**, name (derived from A B C) of small sect of Ger. anabaptists. Holding that only a knowledge of the Scriptures, communicated by the Holy Spirit direct, was necessary, they refused to learn to read.

**A Becket**, Thomas, see **BECKET**.

**A Beckett**, Gilbert Abbott (1811-56), was the first editor of *Figaro in London*, one of the first contributors to *Punch*; he wrote leaders and articles for *The Times*, *Morning Herald*, and *Illustrated London News*. Essentially a playwright, having produced over 50 plays, he helped to dramatise some of Dickens's novels; his fame now principally rests on his *Comic Blackstone* (1846) and comic lists of England and Rome.

**Abel**, 'breath' or 'vapour', second son of Adam (Gen.). He was a shepherd, and because he offered to God a more acceptable sacrifice than that of his brother Cain, the latter slew him in a fit of jealousy. Ranks as the first martyr.

**Abel** (d. 764), archbishop of Rheims; aided Boniface in missionary work in Germany.

**Abel**, Carl (1837-1906), Ger. philologist. He was b. in Berlin, educated at the univs. of Berlin, Munich, and Tübingen, and lectured at Oxford and Berlin. He pub. numerous works, which include: *Linguistic Essays*, 1880; *Slavic and Italian*, 1881; *Über den Gegensinn der Urworte*, 1884; and *Russland und die Lage*, 1888.

**Abel**, Carl Friedrich (1725-87), Ger. musician, player on the viol da gamba, and composer of many melodious pieces. Originally in the court band at Dresden, he came to England in 1759 and became one of the queen's chamber musicians. Joined John Christian Bach in giving concerts in England, 1759.

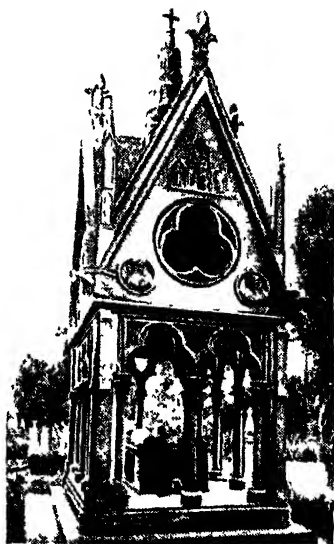
**Abel**, Sir Frederick Augustus (1827-1902), a high authority on explosives, sharing with Prof. Dewar the credit for inventing cordite. Also invented close-test apparatus for ascertaining the flash-point of petroleum. Commenced his career as prof. of chem. at the Royal Military Academy (1851-55), and was afterwards appointed chemist to the war department (1854-88). He was the first director of the Imperial Institute, being appointed in 1887, and pub. many

important works on gunpowder and other explosives.

**Abel, Niels Henrik** (1802-29), Norwegian mathematician, b. at Findø, son of a clergyman. Entered univ., Christiania, 1821, and later became a lecturer there. Is chiefly known for his development of the theory of elliptical functions and algebraic equations. In 1825 the Gov. gave him an allowance to enable him to travel, and, after his premature death from consumption, pub. his works.

**Abelard, Peter, or Pierre** (1079-1142), scholastic philosopher and theologian, b. at Pallet near Nantes; destined to a martial career, he gave up his patrimony and right of primogeniture to study the sciences of his time, and became the disciple of William of Champeaux; he soon rivalled his master in dialectics. At the age of 21 he opened a school of his own, first at Melun, then at Corbeil, and finally at Paris in 1115, where he found that Wm. of Champeaux had been made bishop of Châlons-sur-Marne. The dialectic conflicts now over, A. went to Laon, where he studied divinity under Anselm, dean of the chapter of that tn.; he soon returned to Paris and estab. a school of divinity there, in which he had 5000 pupils; in this school were trained a pope, 19 cardinals, and more than 50 bishops. When he was about 36 years of age, he became enamoured of Héloïse, a damsel of about 17 years of age and daughter to Fulbert, canon in the cathedral at Paris; he became her tutor. She returned his love and bore him a son, being secretly married. Not to impede A.'s preferment she declared that there was no marriage, and Fulbert, enraged, caused A. to be cruelly mutilated, which he knew would prevent preferment in the church. A. recovered; the perpetrators of this crime were similarly punished, and he retired to the monastery of St. Denis, while Héloïse became a nun in the convent of Argenteuil. At the call of his pupils he gave public lessons again, but his enemies raised accusations against his *Introduction to Theology*, in which he attempted to solve anew the doctrine of the Trinity. The council held at Soissons in 1121 ordered this work to be burned. A. retired again to St. Denis, where he irritated the monks by declaring that the monastery had not been founded, as was commonly thought, by St. Dionysius of Athens, the Areopagite converted by St. Paul. He was driven by persecution from St. Denis, and founded a small oratory made of wicker in the ter. of Troyes, but so many pupils flocked to him that it was soon rebuilt of stone; this was called the Paraclete or Comforter. But persecution followed him here, and he left to become superior in the abbey of St. Gildas de Ruys, near Vannes in Brittany. Meanwhile an abbot had claimed Argenteuil, and Héloïse and her nuns were forced to leave it. They were estab. at the Paraclete, A., after an absence of 11 years, officiating in the consecration. Bernard, abbot of Clair-

vaux, objected to the form of prayer used by Héloïse, but A. defended her. Bernard appealed to the council of Sens in Champagne in 1140, at which A. defended himself, but was condemned; he appealed to the pope, but the pope confirmed the condemnation; A. set out for Rome, but Peter the Venerable of Cluny persuaded him to stay with him and influenced Pope Innocent II. to suspend the sentence. A. moved for his health to St. Marcel near Châlon.



THE TOMB OF ABELARD AND HELOISE

He was buried at Cluny, but his remains were removed to the Paraclete; Héloïse lived 20 years after him, and at her death was by her own request laid at the side of A. In 1497 their ashes were moved to the abbey; in 1800 to the garden of the Musée Française at Paris, and in 1817 to the cemetery of Père-Lachaise. After his first fall A. seems to have become sensual, as his letters show; and after his mutilation his affection waned; Héloïse was always devoted till his death. His philosophy, as in *Nosce Teipsum*, often approaches modern rationalism. His *Sic et Non*, showing discrepancies in the writings of the Fathers, was singularly bold for that time of religious intolerance. He opposed both nominalism and realism (*q.v.*). See *Life*, and a philosophic drama, *Abelard*, by Hémusat (Paris, 1845 and 1877); Works ed. by Victor Cousin, 1836. Correspondence between Héloïse and A. is extant; *vide* Pope's *Epistle of Héloïse to Abelard*; *Peter Abelard*, by J. McCabe, 1901; Goo. Moore's *Héloïse and Abelard*.

**Abele**, the Eng. name of the *Populus alba*, or white poplar. See **POPLAR**.

**Abelin, Johann Philipp** (d. c. 1646), Ger. historian, better known under his pseudonym of Johann Ludwig Gottfried, was b. at Strasburg. His writings, all pub. at Frankfort, include vols. i. and ii. of *Theatrum Europæum* (21 vols., 1633-1738); *Historia Orientalis Indiæ*, 1628; *Inventarium Sueciæ*, 1632.

**Abencerrages**, name of a noble family in the Moorish kingdom of Granada, the story of whose long struggle with the rival family of the Zegrís has been the theme of many Sp. chroniclers and romance writers. See **MOORS IN SPAIN**.

**Abenezra** (c. 1093-1167), a celebrated Jewish scholar, b. at Toledo. He lectured and pub. works on philosophy, grammar, medicine, mathematics, and astronomy, and in connection with the last-named science gave his name to a star. He is chiefly known for his great commentary on the O.T.

**Abensberg**, a tn. in Bavaria on the Abens, a trib. of Danube; noted for sulphur baths. A. is the Castra Abusina of the Romans. Pop. 2000.

**Abeokuta**, a tn. in S. Nigeria, cap. of the prov. of the same name. Constituted in 1914, it having previously been the centre of a semi-independent native state. It was founded in 1823 by the inhab. of many neighbouring villages to protect themselves from slave-hunters. The mud walls are 18 miles in length and the tn. consists mainly of mud houses. It is a busy trading centre and exports timber, palm oil, yams, etc. The numerous Christian converts form an influential part of the pop. In 1917 a rising caused by taxation occurred in the prov. Area of the prov. 4266 sq. m. Pop. of tn. 53,000, of prov. 435,000.

**Aber**, a Celtic word, meaning 'mouth of river,' which forms the prefix of many names of places in Great Britain.

**Aber**, name of small vil. in Carnarvon, Wales. Pop. 300.

**Aberavon**, a seaport near the mouth of the Avon in Glamorgan, S. Wales. It is noted for its copper, iron, and steel works, has a good harbour, and is one of the parl. bors. of Swansea. It is now joined with the municipal bor. of Port Talbot. Pop. 16,800.

**Aberayron**, small watering-place in Cardigan, Wales. Pop. 1100.

**Aberbrothock**, see **ARBROATH**.

**Abercarn**, tn. in Monmouthshire; collieries and iron-smelting industry. Pop. 20,600.

**Aberchirder**, tn. in Banffshire, Scotland. Pop. 400.

**Aberconwy**, see **CONWAY**.

**Abercorn**, a place in N. Rhodesia near the S. end of Lake Tanganyika. On Nov. 14, 1918, the Ger. troops surrendered to the Brit. here.

**Abercorn, Duke of**, Irish title held by the family of Hamilton (q.v.). James Hamilton, a Scottish nobleman, was made baron, 1603, an earl in 1606 and, in 1790, his descendant became a marquis. In 1868 the 2nd marquis was made a duke and became lord-lieutenant of Ireland.

His family is portrayed in Disraeli's *Lothair*. James, the 2nd duke (1838-1913), was chairman of the Brit. S. Africa Company; James, the 3rd duke (b. 1869), was governor of N. Ireland, 1922-45.

**Abercrombie, John** (1726-1806), a writer on horticult. subjects, employed at Kew Gardens. In 1767 he pub. *Every Man his own Gardener*, which is said to have been submitted to Goldsmith for purposes of literary revision and returned without any alteration.

**Abercrombie, John** (1780-1844), eminent Scottish physician, b. at Aberdeen; graduated at Edinburgh, and rapidly became one of the foremost men in his profession. Was appointed physician in ordinary to the king in Scotland, 1824, and elected lord rector of Marischal College, Aberdeen, 1836. In addition to many medical treatises he was the author of 2 works that had considerable vogue at the time. These were *Inquiries concerning the Intellectual Powers* (1830), and *Philosophy of the Moral Feeling* (1833), in which he sought to harmonise the facts of science with the revelations of religion.

**Abercrombie, Lascelles** (1881-1938), Eng. poet and prof. of Eng. literature. Was lecturer in poetry at Liverpool Univ., 1919-22, and, from 1922, prof. of Eng. literature at Leeds Univ. His poems include: *Interludes and Poems*, 1908; *Emblems of Love*, 1912; *Deborah*, 3 vols. of plays and verse, 1922; *Four Short Plays* (verse), 1922; *Phoenix*, 1923; and *Twelve Idylls*, 1928. His poetry is complex and generally dramatic in form. It expresses a metaphysical sense of life, with something of the energy of life itself. All his dramatic poems deal, if not with tragedy in the Gk. sense, at least with disaster. Occasionally they suggest the themes of Hardy's lyric or narrative studies, notably *The End of the World*, a fantasy in the *Four Plays* vol. A's normal medium is blank verse, and it exhibits considerable skill in the utterance of colloquial sentiments without being casual or conventional. Perhaps his most notable achievement is the *Emblems of Love*, which contains much of his scattered work. *Deborah* is a tragedy of an attempt to shape life which fails; *Phoenix* expresses the shock of the actual world coming upon a group of romantics. The poems, *Interludes and Poems*, which are highly metaphysical, are concerned with the meaning of Self.

**Abercrombie, Sir Leslie Patrick** (b. 1879), Brit. architect, son of William A. Educated at Uppingham. Prof. of Civic Design, Univ. of Liverpool, 1915-35; prof. of Town Planning, Univ. College, London, 1935-46. Member of Royal Fine Art Commission; of royal commission on location of industry; chairman of Council for Preservation of Rural England; consultant for rebuilding and planning London, Plymouth, Bath, Hull, Bournemouth, and the Clyde region. Pub. *Town and Country Planning* (1935); his later planning, as shown in the second ed. of this work (1943), takes account of the fact that, after the Second World



War had begun, the absence of the normal security of life and the destruction of the centres of many of our tns. have made us reconsider our whole environment from what it appeared to be in 1933. His *Greater London Plan, 1944* (1945) is a report prepared on behalf of the Standing Conference on London Regional Planning at the request of the minister of Tn. and Country Planning. Many persons contributed to this plan, 'the area being so vast, the population so great, the aspects so complex and the existing conditions so determining, that no single technician could hope to resume in his person the necessary knowledge and skill' and therefore 'all such attempts at foreseeing the trends of, and proposing some direction to, human environment, must be a co-operative task'; but the task of co-ordinating the whole plan was the responsibility of A. alone. The broad principle of this ambitious report is to locate pop. and industry more logically, to improve transport radically, and to determine a proper use of land. It represents an attempt to make use of the opportunity offered by the late war, which introduced three new factors: the destruction of large areas, particularly in the centre; the evacuation of a large proportion of the pop.; and the industrial upheaval due to almost universal war production. Other publications include: *The Preservation of Rural England, 1926*; *County of London Plan, 1943* (with J. H. Forshaw); *A Plan for Plymouth, 1943* (with J. Paton Watson).

**Abercromby, David** (d. 1701-2), a Scottish physician and metaphysician of the seventeenth century, of whose life little is known save what he himself has told in his book, *Protestancy to be Embraced* (1682). Was educated as a Rom. Catholic, and lived for 18 years with a Fr. Jesuit order, but finally embraced the Protestant faith.

**Abercromby, Patrick** (1656-1716), antiquary and historian, was physician to James II., 1685. Was a Jacobite, and opposed to the union of Scotland with England. His chief work was *Martial Achievements of the Scots Nation* (1762).

**Abercromby, Sir Ralph** (1734-1801), general, b. at Menstrey, Clackmannanshire, educated at Rugby, and studied law at Edinburgh and Leipzig. Represented Clackmannanshire in parliament for a while. He accompanied the Duke of York on the 2 disastrous campaigns against the Fr. in Holland (1793 and 1799), and by his skill and humanity gained the affection and admiration of the whole army. This humanity led to his removal from the post of commander in Ireland during the rebellion of 1797 to a similar post in Scotland. On Feb. 18, 1797, Chacon, Sp. governor, surrendered Trinidad to A. without a fight, and the cession was confirmed by the treaty of Amiens, 1802. He was wounded during an engagement with the Fr. at Alexandria, Egypt, and, though victorious, d. a week later.

**Aberdare, a tn., Glamorgan, S. Wales.** It is situated on an important coalfield,

has extensive coal and iron works, and is in direct communication with the large ports in S. Wales, whence its coal and iron goods are exported. Pop. 48,700.

**Aberdare, Henry Austin Bruce, first Baron** (1815-95), statesman. Stipendiary magistrate for Merthyr Tydvil and Aberdare from 1847 till 1852, when he entered parliament as representative of the same dist. as a Liberal. Held many high appointments, including the home secretaryship, 1869-73, and the Presidency of the Council, 1873-74. In the former capacity he conducted the reform of the licensing laws. Was the first chancellor of the univ. of Wales, 1894.

**Aberdeen:** 1. An important city in the N. of Scotland, situated between the mouths of the Dee and Don rivs. In 1179 William the Lion granted it a charter, and it became a royal burgh, but in 1336 it was burned down. It was rebuilt as New A., and soon became a flourishing tn. It is a beautiful city, mostly built of granite, and amongst its buildings are the municipal buildings, the market hall, the art gallery and school, the Royal Infirmary, the lunatic asylum, trades hall, Marischal College, and Gordon's College. There are many places of worship, of which the most important are the church of St. Nicholas and the Rom. Catholic cathedral in Old A. Old A., on the Don, is now incorporated in the municipality. The statues and the Duthie public park are also famous. As a commercial and industrial tn. it plays a leading part, the ann. value of its trade running into millions of pounds. Its harbour has been greatly improved by a pier of granite, and its chief industries are herring and salmon fishing, brewing, distilling, shipbuilding, paper-making, quarrying, and the manuf. of woollen, cotton, linen, and jute goods. In recent years the ann. value of the fish landed has exceeded £2,000,000. As mine-sweepers and patrols the A. trawlers did good service during the First World War. King George V. opened the city's war memorial in 1925. A. has a disadvantage in not being within easy reach of coal and iron. It trades chiefly with Great Britain, America, the E. Indies, the W. Indies, and the Baltic and Mediterranean ports. It is a univ. city. King's College was founded in 1494 at Old A. by Bishop Elphinstone, and Marischal College was founded in 1593 by George Keith, Earl Marischal. Celebrated people connected with A. are Barbour, whose tomb is in the cathedral, and who was archdeacon of A. from about 1356 until his death; Hector Boece, prin. of King's College; George Campbell, prin. of Marischal College; and Byron, who received his early education at the grammar school. Pop. 168,000. 2. Cap. Monroe co., Mississippi, U.S.A.; manufs. bricks and machinery; exports cotton seed. Pop. 14,000. 3. Cap. Brown co., S. Dakota, U.S.A.; manufs. chemicals. Pop. 17,800. 4. Tn. in Chohals co.,

Washington; has saw-mills and machine shops. Pop. 18,500.

**Aberdeen Angus Breed**, see under CATTLE.

**Aberdeen, George Hamilton Gordon**, fourth Earl of (1784-1860), statesman and Prime Minister of England. Educated at Harrow and Cambridge, and in 1801, on succeeding to the earldom, travelled in Greece; hence Byron's oft-quoted line, 'The travelledthane, Athenian Aberdeen.' Ambas. at Vienna (1813), and signed the treaty of Teplitz.



LORD ABERDEEN, FOURTH EARL

Entered political life as a Tory, and became successively chancellor of the duchy and foreign secretary in Wellington's Cabinet (1828-30), but although he held office (colonies and war) under Peel (1834-35) and was again foreign secretary (1841-46), he gradually abandoned his high Tory principles and resigned with Peel in 1846. In 1852 succeeded Lord Derby as Prime Minister, forming a popular coalition ministry. His ministry soon met with disfavour owing to the mismanagement of the Crimean war, and he resigned after the carrying in the House of Commons of Mr. Roebuck's motion of censure.

**Aberdeen, Sir John Campbell Gordon**, first Marquess and seventh Earl of (1847-1934), grandson of fourth earl, was twice lord-lieutenant of Ireland (1896 and 1905-1915), and governor-general of Canada, 1893-98. Marquisate created Jan. 4, 1916.

**Aberdeenshire** is one of the N. cos. of Scotland, with an area of about 1972 sq. m. The coast-line is fairly regular; but there are points and headlands towards the N.E., of which Buchanness is the most easterly point of Scotland. Further N. there are high rocks and caves. In the S.W. the co. is bounded by the Grampians, which in their highest

peaks rise to over 4000 ft. Cairngorm, Ben Macduh, Cairntoul, and Loch-nagar are the prin. points. The surface is generally hilly, and is watered by the rs. Dee (87 m.), Don, with its trib. the Urie (82 m.), Ythan (36 m.), Deveron (50 m.), and the Ugie with their various tribes. The soil on the whole is not fertile except in that portion between the rs. Don and Ythan, but owing to the industry of the people crops of barley, oats, and turnips are produced. Much of the land is covered with fir, ash, birch, and poplar trees, and in some parts sheep and cattle are reared. Herring and salmon fishing is a great industry, especially at Peterhead and Aberdeen. The co. is divided into 5 divs., Mar, Formatin, Strathbogie, Buchan, and Garrioch; and the most important tns. are Aberdeen, Peterhead, Fraserburgh, Inverurie, Kintore, Charlestown, Old Meldrum, Huntly, and Turriff. There are many small vis.—Ballater, Boddam, Newburgh, Newlyth, and Strichen. The ruins of old feudal castles still exist, among which may be noted Dundargue, Ken-Edgar, Craigston, Fedderessett, Slains, and Fyvie. Balmoral is noted for its castle. The co. returns 2 members to parliament. Pop. 323,000.

**Aberdeen Terrier**, see Scottish Terrier.

**Aberdevine**, see SISKIN.

**Aberdovey**, a seaside resort in the urb. dist. of Towyn in Merionethshire, Wales, on the estuary of the Dovey, about 10 m. N. of Aberystwyth. Pop. of urb. dist. 4500, of tn. 1200.

**Aberfeldy**, a vil. on the r. b. of the R. Tay in Perthshire, Scotland. The scenery around, referred to by Burns in *The Barks of Aberfeldy*, is very beautiful, the falls of Moness being a great attraction. Pop. 1560.

**Aberfoyle**, a vil. on the R. Forth in Perthshire; the scene of Scott's *Rob Roy*. Pop. 1200.

**Abergeldie Castle**, an Aberdeenshire royal seat, situate on the R. Dee near Balmoral.

**Abergavenny**, a tn. in Monmouthshire, at the confluence of the Usk and Gaveenny. It is an old Rom. settlement (Gobannium); there are remains of an old castle and of a Benedictine priory; and it has an old church and sev. other places of worship. Coal and iron are found in the vicinity, but it is chiefly noted as a wool market. Pop. 8600.

**Abergavenny, Baron**, see NEVILLE.

**Abergele**, on the coast of Denbighshire, N. Wales. It is an old Rom. camp, and Harold was defeated by Gruffydd ap Llewelyn near there. It is now noted as a seaside resort. Pop. 2600.

**Aberhart, William** (1878-1943), Canadian politician, b. in Ontario and educated at Queen's Univ. Principal at high school in Calgary, Alberta. Organised a social credit movement, which won the provincial election in 1935, A. becoming Prime Minister of Alberta on Sept. 3 of that year. He then tried to establish a currency system on social credit principles, his proposals involving the grant of a 'basic dividend' of \$25

a month to every citizen, payable in non-negotiable certificates deposited with a special bank. These proposals also involved price control and taxation to recover expenditure for the dividends. The Alberta legislature passed the necessary legislation, including the Bank Taxation Bill, the Credit Regulation Bill, and a Press Control Bill, but all these measures were declared *ultra vires* by the Supreme Court of Canada, and their decision was upheld by the Judicial Committee of the Privy Council. Other unorthodox measures having failed A. reverted to orthodox finance but, in 1937, the Alberta budget showed a deficit of 1½ million dolrs. By 1940 his majority had become considerably reduced. A.'s Social Credit Gov. was defeated for the first time in Feb. 1937 on a motion to adjourn the debate on the budget; after which A. introduced a social credit bill providing for a commission to administer the social credit plan. But, in 1940, on his own advice, the legislature was dissolved, though the Social Credit Gov. was returned to power in the provincial election with A. at its head.

**Abernethy**, a vil. on the Tay, Perthshire. It was the ant. cap. of the Picts, and possesses a round tower, the date of which is uncertain. Pop. 1150.

**Abernethy**, John (1680-1740), Irish Protestant divine. By his refusal to accept the synod's decision that he should go to Dublin (1717) he caused a div. in the Irish Presbyterian Church, the 2 parties becoming known as 'subscribers' and 'non-subscribers.' Ultimately he went to Dublin (1730), where he engaged in many theological controversies, and strongly opposed the Test Act.

**Abernethy**, John (1764?-1831), celebrated surgeon, grandson of Irish Presbyterian clergyman (*supra*). Place and date of birth doubtful, probably Derry in Ireland. Educated in Wolverhampton, he was appointed assistant surgeon at St. Bartholomew's Hospital, 1787. Full surgeon from 1815 to 1827, during which period he gained a wide reputation for his daring and skilful conduct of operations for the cure of aneurism. He pub. many medical works, and laid down two important principles, which greatly influenced all subsequent surgical practice, the first being that local diseases had a constitutional origin, and the second that this origin could generally be traced to disorders of the digestive system. His reputation, however, rests mainly on his power as a lecturer, and he was easily the most popular medical teacher of his day.

**Aberration**, a deviation: in biology, an abnormal structure, or departure from the type. In optics, the term is used in two different senses.

**A. of Light**, the apparent deviation of a star from its path, a phenomenon depending upon the relation between the velocity of light and the velocity of the earth in its orbit. A man walking with an umbrella provides what is perhaps the best illustration. If he wishes to shelter

himself from vertically descending rain, he has to hold the umbrella before him at an angle which varies with his own pace and also with the downward speed of the rain. If his own rate is slow and the rain is descending swiftly, the umbrella is held fairly upright; but a brisk walk through slowly falling rain necessitates inclining the umbrella well to the front. Now consider the case of an observer looking at a star through a telescope. The rays of light come from the star with a velocity of 186,330 m. a second, whilst the observer himself with his telescope is travelling along the earth's orbit. In order to catch the rays proceeding from the star in the telescope tube, the instrument has to be tilted away from the direction of the light, just as the umbrella has to be inclined away from the true direction of the rain. The slope of the telescope therefore indicates as the position of the star a point which is somewhat in advance of its true position. The path of the earth around the sun is elliptical, so that, in the course of a year, the successive points to which the telescope has been directed will be found to be on the circumference of a small ellipse, with the true position of the star as the point of intersection of the axes. The minor axis of this ellipse depends upon the latitude of the star, because if it be near the plane of the earth's orbit it will appear flattened out; but the major axis is the same for all stars and is found to be approximately 40". This means that the maximum apparent deviation of the star from its true position is 20" (more exactly, 20.45") in each direction. As A. depends upon the ratio between the velocity of light and the velocity of the earth, the determination of this 'constant of A.' provides a method of calculating one of these velocities if the other be known.

**A. in Optics—Chromatic A.**—When ordinary white light passes through a lens with thin edges, the violet rays are most refracted, and tend to come to a focus before the red rays. If a screen be placed so as to intercept the rays, in one position the image will be found to have a red border, owing to the red rays not yet having converged; whilst, on moving the screen a little further from the lens, the border becomes violet, because the violet rays are now diverging again. A. of this kind, called chromatic (Ch. chroma, colour), interferes with the usefulness of optical instruments. It may be remedied by coupling 2 lenses made of different glass, so that the difference in refracting power may lead to an adjustment, bringing all the coloured rays to the same focus.

**Spherical A.**—Even when the light passing through a lens is monochromatic, the focusing is never quite exact. The image of a point is shown as a small circle, so that objects perceived are blurred in outline. This is not so serious a fault in lenses as chromatic A., and can be avoided to some extent by the use of diaphragms limiting the used area of the lens.

**A.** is also occasioned by mirrors of spherical form. A parabolic mirror, however, gives an exact focus, which is the reason why such mirrors are used when a parallel beam of light is required. the source of light in this case being placed at the focus.

**Abershaw, Louis Jeremiah, or 'Jerry'** (1773-95), celebrated highwayman mentioned by Borrow in his *Laurel* as *Jemmy Abershaw*.

**Abersychan**, a tn. in Monmouthshire. Its position near a large coalfield makes it a centre for iron and steel works. Pop. 12,300.

**Abertillery**, a tn. in Monmouthshire, noted for its collieries and tin-plate works; pop. 22,800.

**Aberystwyth**, a municipal bor., mrkt. tn., and seaside resort of Cardiganshire, Wales, on Cardigan Bay. It is the seat of the Univ. College of Wales and of the National Library of Wales. Its fine situation has made it a popular holiday centre. There are good beaches for bathing and facilities for every kind of sport, including deep-sea and fresh-water fishing. There is a pier, and an extensive promenade. Some ruins of the twelfth-century castle remain. Pop. 9500.

**Abeshir**, cap. of Central Sudan, on the caravan route from Khartoum to Kuka; pop. about 25,000.

**Abettor**, a term used both in a legal and general sense, indicates a person who instigates or encourages an offence, without taking any active part in it. See also **ACCESSORY AND ACCOMPLICE**.

**Abeyance**, a legal term derived from the O.Fr. *beer*, to gape after. The term is used to imply the state of suspense of the rights in a freehold or a title of honour. It is a maxim of Eng. law that freehold cannot be put in A. by any action of the owner, the underlying idea being that some person should be in existence for the discharge of feudal duties. Where, however, a life interest only exists in lands, such, for example, as is the case of a bishop, that interest is said to be in A. until the appointment of his successor. In the same way where a title can be held only by male heirs that title may be in A. if the persons next in inheritance to the last possessor are females. The title is not extinct, for the birth of a son to any of the female heirs can revive it.

**Abgar**, name of a line of rulers of Edessa in Mesopotamia. They were 28 in number, the best known being the fourteenth. He it was who is said to have written to Jesus asking him to come and cure him of a disease. Eusebius of Caesarea trans. this letter and the reply of Christ, promising to send a disciple after his ascension, from the Syriac to Gk., but their authenticity was discredited by Pope Gelasius in 494.

**Abhorers**, the court party in the reign of Charles II. who were opposed to and 'abhorred' the views of the rival party, led by Shaftesbury, who were opponents to the royal prerogative. The former party were subsequently called **Tories** and the latter **Whigs**. See also **TORY**.

**Abiathar**, high priest in the reign of

the Heb. kings David and Solomon. Escaping from the massacre by Saul of the sons of Ahimelech (his father, also high priest), he joined David at the cave of Adullam, and remained faithful to David during the life of the latter. He was deposed by King Solomon for his participation in the rebellion of Adonijah and banished.

**Abib**, or **Nisan**, formerly the first month in the Jewish calendar, but according to present-day reckoning the seventh. Corresponds to part of Mar. and part of Apr. In it is celebrated the feast of the Passover.

**Abies**, see **FIR**.

**Abies**, in fossil botany, is the name given to the *A. laricioides*, a single incomplete specimen of a fruit resembling the spruce fir (*A. excelsa*), by Brongniart. Its locality is unknown.

**Abietinæ**, a genus of the Conifere, with perfect cones, the seed hidden between scales, hard testa, and no aril. The cones are usually monocious.

**Abigail**, the wife of Nabal, the churlish rich man who refused hospitality to King David when he had to flee his kingdom. Intercepted David when later he returned to punish her husband, and so won his heart that not only did he forgo his chastisement of Nabal, but after the latter's death he took A. to wife. Another A. was the sister of David. The name abigail is used for a waiting-maid or female domestic from the style of 'hand-maid' which A. used to designate herself when speaking to David.

**Abijah**, name of more than one biblical character, of whom the chief was the son of King Rehoboam. He was engaged in war with and defeated Jeroboam, the other king of the then divided kingdom of Palestine.

**Abila**, see **ABYLA**.

**Abilene**, co. seat of Taylor co., Texas, U.S.A., 160 m. W. of Fort Worth; has flour and planing mills, and deals in cotton. Pop. 26,600.

**Abimelech**. (1) Name of two Philistine kings, father and son, who, taking the wives of Abraham and Isaac to be their sisters, married them. Both were restored to their former husbands with reparation on their true relationship being revealed. (2) Natural son of Gideon, the Heb. judge, who, by the murder of his 70 brothers (except the youngest, Jotham, who escaped), made himself king of Shechem. Jotham later appeared and propounded to the subjects of A. the parable of the bramble-king, the first recorded biblical parable. A. was killed by a woman while besieging the rebel city of Thebez.

**Abingdon**, an historic tn. on the Thames, 6 m. S. of Oxford, formerly the co. tn. of Berkshire; now a flourishing residential and mrkt. tn. with some light industries (motor cars, leather works). Many interesting buildings include remains of the Benedictine abbey (founded seventh century), the Guildhall, the former co. hall (1677), a fine par. church (c. 1450), and the Elizabethan schoolroom of what is now a boys' public school. Pop. 11,250.

**Abingdon**, the co. seat of Washington co., Virginia, U.S.A., near Walker's Mt., on the Norfolk and Western railroad. It has sev. educational institutions—the Martha Washington College, 1858, and Stonewall Jackson Institute, 1869 (both for women), and A. Academy. There are manufs. of tobacco, bricks, and wagons; flour and planing mills, and trade in live stock. Pop. 3000.

**Abingdon**, Earl of, *see* BERTIE, WILLOUGHBY.

**Abinger**, a vil. near Dorking, Surrey. It has an observatory, to which, in 1925, was transferred from the Royal Observatory, Greenwich, the work of recording earth magnetism.

**Abinger**, Sir James Scarlett, first Baron (1769–1844), Eng. politician and judge, b. in Jamaica, studied in the Inner Temple, and called to the bar in 1791. In 1791 entered parliament as Whig member for Peterborough, was knighted and appointed attorney-general in Canning's ministry (1827), and in Wellington's (1829–30). Successfully carried through a Bill to amend the administration of justice (1830), but opposed the Reform Bill of 1831. Was returned as a Tory for Cokerborough (1831), and then Norwich (1832), and was elevated to the bench by Peel (1834) as lord chief baron of the Court of Exchequer.

**Abington** (or **Habington**), Edward (1553–86), a conspirator in the Catholic plot of Babington against Queen Elizabeth. Although protesting his innocence, he was sent to the Tower and hanged and quartered, Sept. 20, 1586.

**Abington**, Mrs. Fanny (1737–1815), celebrated actress, b. in London. Début at Haymarket, 1755, as Miranda in *The Busybody*. Created 30 original characters, including Lady Teazle (1777), and impersonated many of Shakespeare's heroines.

**Abington** (or **Habington**), Thomas (1560–1647), brother of Edward (*supra*), and like him imprisoned for complicity in Babington's plot, 1586. The letter to Montague warning him of the Gunpowder Plot is attributed to A.'s wife.

**Abiogenesis**, the supposed production of living from non-living matter. The more popular term is spontaneous generation, and under this name the possibility of the phenomenon was generally believed in until recent times. The ancients supposed that bees and flies were generated in putrefying carcasses, and that mud and filth brought forth such creatures as eels, frogs, and mice. The growing knowledge of the life hist. of those animals gradually dispelled the belief, but at a later period it was held that the bacteria of fermentation and putrefaction owed their origin wholly to the substances in which they were found. Pasteur was to a great extent responsible for the conclusion that if a substance has been sterilised, only infection from outside sources can re-introduce bacteria. Complete sterilisation, however, is difficult to obtain, for some bacteria survive the temperature of boiling; and the presence of germs, too, is so widespread

and their multiplication so rapid that workers before the time of Pasteur had found it difficult to establish a direct refutation of the theory. The mere fact that the earth must have been at one time a molten mass of inorganic matter is sufficient to encourage many in the belief that it may yet be possible to produce life from non-living matter. On Pasteur's work are based all the modern methods of food preservation by canning, bottling, etc., including the pasteurisation of milk, named after him. *See* ANTI-SEPTICS.

**Abipones**, formerly a fine race of S. Amer. Indians inhabiting Paraguay who by their courage proved very formidable opponents to the Spaniards. Now incorporated with other tribes.

**Abishai**, King David's nephew, a man of great courage and prowess in battle. Accompanied David on the night expedition to camp of Saul (1 Sam. xxvi. 6–9). On one occasion with 2 others he broke through the Philistine ranks, and on another slew 300 men. Was faithful to David during Absalom's revolt. *See* Chronicles and Samuel *passim*.

**Abjuration of the Realm**. By the old common law of England if a person accused of any crime other than treason or sacrilege took sanctuary in a par. church or churchyard, and within 40 days went in sackcloth to the coroner and confessed his guilt, he was allowed to take the oath of A. of the R., i.e. he would leave the country forthwith and never return without licence from the king. All his property was forfeited, and the penalty for returning without leave was hanging. By a statute of Elizabeth (35 Eliz. c. 2), Rom. Catholics and Dissenters might be required to abjure the realm. The privilege of sanctuary was abolished in the reign of James I.

**Abjuration, Oath of**. An oath taken by holders of public office, such as members of parliament, clerics, and lawyers, originally imposed in the reign of William III., and requiring the taker of the oath (juror) to abjure the claims of the Stuart pretender or his heirs to the throne. It also rejected the opinion that the pope of Rome had any jurisdiction in England, or that princes excommunicated by him could be deposed or murdered. After many modifications with a view to relieving Jews, Catholics, etc., the various statutes were consolidated in the Promissory Oaths Act, 1868. The famous Bradlaugh case (*q.v.*) arose from Bradlaugh's objection to the final wording of the oath, 'so help me God.'

**Abkhazia**, or **Abasia**, an autonomous S.S.R. of Georgia comprising about 2500 sq. m. on the S. slope of the Caucasus. Successively under Persian, Georgian, and Turkish control. It was annexed by Russia in 1809, but not pacified till 1864. The people are occupied in agriculture, cattle-raising, and lumbering. The cap. is Sukhumi. Pop. (estimated) 200,000.

**Ablancourt**, Nicolas Perrot d' (1608–1664), Fr. translator of Gk. and Rom. writers. He trans. the whole of Tacitus

and 4 of Cicero's orations, but his versions, being somewhat paraphrastic, have long been superseded.

**Ablative Case**, see under DECLENSION.

**Ablaut** is a Ger. term used by philologists to signify a relation existing between the vowels of certain series of related words in Indo-European languages, caused by the Indo-European system of accentuation. It is most clearly shown in the strong verbs, where it is still to be found in modern Eng. The relation of *i, a, u* in the verb *drink, drank, drunk* is an A. relation, the vowels themselves forming an A. series.

**Able-bodied Seaman (A.B.)**. In the R.N. a youth about 18 years on for 12 years, and after attaining proficiency in gunnery, or any other specified branch or trade, becomes an A.B. In the merchant service, the term is used for any man who has had 2 years' experience before the mast.

**Ablution**, or Purification, a rite of the ant. Jewish and other churches by which the purification of the soul was symbolised by the washing of the body. The Mosaic law has a very elaborate code of rules for this ceremony. The term is also used to indicate the washing of the chalice and the priest's hands after mass.

**Abner**, a cousin of the Heb. king Saul, and captain of his army. After the death of Saul he proclaimed Ishbosheth king. Seeking to reconcile the rival claims of Ishbosheth and David, he visited the latter at Hebron, where, to David's great sorrow, he was treacherously slain by David's captains, Abishai and Joab.

**Abney Park**, a dist. in N. London. It is in the bor. of Stoke Newington, and has a large cemetery, dedicated in May 1840 and notable for its old trees and arboretum. The dist. is named after Sir Thomas Abney, who lived here.

**Abney, Sir Thomas** (1610-1722), one of the original promoters and directors of the Bank of England. Benefactor of St. Thomas's Hospital; lord mayor of London, 1700-1.

**Abney, Sir William de Wiveleslie** (1844-1921), Eng. physicist and astronomer; *b.* in Derby, educated Royal Military Academy, Woolwich. Captain in Royal Engineers, 1873; president Royal Astronomical Society, 1893-95; president Physical Society, 1895-97; prin. assistant secretary Board of Education (Science Dept.), 1899-1903. Thenceforward adviser to the Board of Education and to the War Office. Pub. important works on photography, especially stellar photography, and wrote valuable treatises on spectroscopy. *Instruction in Photography*, 1870; *Treatise on Photography*, 1875; *Colour Vision, Colour Measurement and Mixture*, 1893; *Researches in Colour Vision*, 1913; *Trichromatic Theory of Colour*, 1914. He also wrote *Thebes and its Five Great Temples* (1876), and with C. D. Cunningham *The Pioneers of the Alps*, 1887.

**Äbo (Turku)**, important tn. in Finland, and formerly cap., situated on the Åra-

joki R. not far from its mouth. Its univ., founded in 1640, was removed to the present cap., Helsinki, after the disastrous fire which destroyed its buildings and most of the tn. in 1827. Important shipbuilding and timber trade. Pop. 74,000.

**Äbo, tn.** in S. Nigeria at head of Niger Delta. Palm oil largely exported. In 1930 Ä. (and also Opofo) was the scene of rioting, in which native women took a leading part, the cause of the unrest being the uneconomic prices obtained for palm kernels. In the restoration of order, more than a score of women were killed by the rifle fire of native police. Pop. 8000.

**Abolitionists**, name of party in the U.S.A. who demanded the abolition of slavery. Although many individuals had held opinions hostile to slavery, especially among the Quakers, it was not until 1774 that Benjamin Franklin presided over their first congress in Philadelphia. Towards the end of the third decade of the nineteenth century the movement against slavery began to make great headway, and in 1831 one of its chief leaders, William Lloyd Garrison (q.v.), began to pub. its organ, the *Liberator*, in Boston. The New England Anti-Slavery Society, formed in 1832, became the nucleus of a great political party which influenced and finally (1856) merged with the Republican party. The feeling against the A. was naturally very strong in the S. or slave-owning states, the Legislature of Georgia even going the length of offering a reward of 5000 dol. to any one who could secure the conviction of Garrison. Even in his own city of Boston, Garrison was severely handled by the mob. No doubt much of the unpopularity incurred by the A. was due to the practical assistance rendered to runaway slaves by an organisation called the 'Underground Railway.' The A. ideals finally triumphed when President Lincoln proclaimed the freedom of the slaves on Jan. 1, 1863.

**Abomy**, a walled city, formerly the cap. of Dahomey, the negro kingdom of W. Africa, about 70 m. from the present cap., Porto Novo. It was occupied by the Fr. when they conquered Dahomey in 1892. Has an extensive trade in palm oil, gold, and ivory. Pop. 20,000.

**Aborigines**, formerly the name given by Gk. and Rom. writers, who treated of the earliest period of Rom. hist., to a tribe who occupied, with their allies the Pelagi, the dist. of Latium. Now used to denote the original inhab. of any country, and more particularly the natives found in a country conquered or colonised by Europeans. The term is also used to denote the original fauna and flora of a place. The Aborigines' Protection Society, founded in 1833, has been instrumental in securing the framing of regulations designed to secure the natives of Brit. and other colonies from ill-usage by white officials or colonists. In 1872 and 1875 Acts were passed for the protection of the Pacific islanders, more especially in relation to their

Importation as labourers into the Australian colonies. The dominion of Canada has exclusive control over its aboriginal tribes, but for other colonies special protection is afforded the natives by the imperial gov. In 1890 the General Act of the Brussels Conference was signed, by which the adhering powers agreed to certain restrictive measures concerning the sale of drink to natives, etc.



AUSTRALIAN ABORIGINE

**Abors**, savage race of hillmen inhabiting the hinterland of Burma, against whom a punitive expedition was despatched by the Indian Gov. in 1911 to avenge the death at their hands of Mr. Williamson, an Anglo-Indian official.

**Abortion** (*aboriri*, to miscarry), the premature expulsion of the foetus from the womb before the seventh month. Later, such an occurrence is called premature labour. The term *A.*, however, is often restricted to cases where such expulsion is deliberately contrived: either by doctors as a measure calculated to save the mother from death or serious illness, or by persons who desire to evade the responsibilities, or perhaps (in the case of illegitimacy) the shame, of motherhood. Cases of *A.* due to accidental or pathological causes are frequently known simply as miscarriages.

The expulsion of the foetus is by no means rare, and may be the result of a salutary effort of nature to get rid of diseased matter within the womb, or may be due to preventable causes. The malformed or diseased condition of the womb may lead to the death of the foetus,

when any further association with the mother is fraught with grave dangers to her health. In this case the body makes its own preparations for getting rid of the dead matter and miscarriage takes place. Abnormal excitement during pregnancy, sudden shock, a fall, over-reaching, or over-straining are all liable to cause *A.*, and should therefore be avoided by a woman about to become a mother. In general it may be said that in the upper classes persistence in the more exciting forms of society pleasures provides a cause; whilst among women of the labouring classes the necessity for somewhat severe manual work is frequently responsible for miscarriage.

The symptoms comprise pains in the loins and a sense of bearing down, accompanied by a discharge of blood. The discharge, if continued, results in the expulsion of the foetus, and it is advisable that the matter discharged should be kept for examination by a medical man, as the treatment depends upon the possibility of preventing the miscarriage altogether. The patient should be kept quiet in a recumbent position, and the abdomen kept cool. If it be impossible to prevent the occurrence, the treatment then aims at bringing about the expulsion as quickly as possible, and with a minimum amount of derangement.

*A.* has naturally a weakening effect upon the system, and complete rest for some time is imperative. One of the most important after-effects is the liability to the establishment of a 'habit'; that is to say, a miscarriage may take place at the corresponding period in a subsequent pregnancy. In this connection it may be noted that tendency to miscarriage is often aided by what would be in point of time the menstrual period.

The procuring of *A.* by a pregnant woman, by taking drugs or using instruments, is a felony, and any person who endeavours to procure the miscarriage of any woman by administering drugs, or using any instrument or other means with the same object, is guilty of a felony. The penalty is penal servitude for life or not less than 3 years, or imprisonment not exceeding 2 years with or without hard labour. To supply or procure drugs or instruments, knowing that they are to be used with the object of procuring a miscarriage, is a misdemeanour. The penalty in this case is penal servitude not exceeding 5 nor less than 3 years, or imprisonment not exceeding 2 years with or without hard labour. Persons tried under the Offences against the Persons Act, 1861, for administering drugs or using instruments to procure *A.*, may be convicted of the felony of child-destruction under the Infant Life (Preservation) Act, 1919. An *A.* brought about artificially to save the mother's life or health is not a crime; but the burden of proof is on the person bringing about the *A.*

**Abou-hannes** (*Ibis religiosa*, Cuvier; *Tantalus æthiopicus*, Latham), an Egyptian word meaning Father John, is a

bird which in anct. times was regarded with great veneration by the Egyptians. It is no doubt the white or sacred ibis mentioned by Herodotus (il. 76).

**Abou-harb**, the Arabic name of the *Leucoryx antelope*.

**Abou-hossein**, the Arabic name of a species of fox (*Canis pallidus*), found in Darfur and Kordofan. Rüppel, *Zool. Atlas*.

**Aboukir**, a vil. on Aboukir Bay, 13 m. N.E. of Alexandria, Egypt. Its historical connections make it famous. The battle of the Nile was fought in Aboukir Bay, 1798, when the Fr. were completely defeated by Nelson. In 1799 Napoleon defeated the Turks with an army of 18,000 men there, and in 1801 Sir Ralph Abercrombie defeated the Fr.

**Abousambul**, **Abu Simbel**, or **Ebsambul**, see **IPSAMBUL**.

**Abou-schom**, the Arabic name of a species of fox (*Canis variegatus*), found in Nubia and Upper Egypt. It does not burrow, but resides among rocks.

**About**, Edmond François Valentin (1828-85), a distinguished Fr. author, was b. at Dieuze, Lorraine, and educated at the Ecole Normale, Paris, and at Athens. In 1854 he wrote *La Grèce contemporaine*, which was a great success, and *Tolla*, a novel, 1855. Then followed *Les Mariages de Paris*, and by this time his reputation was estab. His other works are: *Le Roi des montagnes*, 1856; *Germaine*, 1857; *Madelon*, 1863; *La Question romaine*, *Le Nez d'un notaire*, 1862; *L'Homme à l'oreille cassée*, 1862; *Le Cas de M. Guérin*, 1862, 3 fantastic tales; *Trente et quarante*, 1865; *L'Infâme*, 1867; *Le Progrès*, a study of social reforms, 1864; *Le Turco*, 1866; *Les Mariages de Provence*, 1868; and *Le Roman d'un brave homme*, 1880. He contributed to the journals and founded *Le XIX<sup>e</sup> Siècle* in 1871, and wrote political pamphlets. As a dramatist, however, he was not successful, although he wrote *Gaetano*, 1862, and *Guillery*, 1856, a comedy. He was elected a member of the Fr. Academy, 1884. See *Life* by M. Thiébaud, 1936.

**Abraham**, see **ABARBANEL**.

**Abacadabra**, a magical word, written in the form of a triangle, and used by anct. as a spell to overthrow evil spirits, to cure fever and other maladies.

A B R A C A D A B R A  
A B R A C A D A B R  
A B R A C A D A B  
A B R A C A D A  
A B R A C A  
A B R A C  
A B R A  
A B R  
A B  
A

According to Serenus Sammonicus, a doctor and poet, at the commencement of the third century, the letters of the word must be written in the form of a triangle so that it can be read in different ways. It was often written on a piece of paper, folded, and worn round the neck.

**Abraham**, the great patriarch of the Heb. race with whom the hist. of Israel begins. Born in Ur of the Chaldees, the son of Terah, an idolater (Joshua xxiv. 2), he set out with his father, his wife, Sarai, who was also his half-sister (Gen. xx. 12), and Lot his nephew, and settled for a time in Haran, where Terah d. (Gen. xi. 31). Thence, at the call of God, he went into Canaan, taking his wife and nephew, with his household and property (Gen. xii. 1). At Shechem A. first received the promise of the land. There he built an altar to the Lord; a second he built at Bethel, as he journeyed S. (Gen. xii. 7-9). Dearth in Canaan drove A. to Egypt, where, calling Sarai his sister, he brought her into grave danger. God protected her, and A. returned to Canaan with the reproach of Pharaoh, whom he had deceived (Gen. xii. 10; xiii. 1). A. and Lot separated at Bethel, and A. moved to Hebron (Gen. xiii.). He defeated Chedor-laomer, who had taken much plunder and many prisoners, including Lot, and both booty and captives were rescued. Melchizedek, king of Salem, met A., and blessed him. A. now an old man and childless, doubted the promise to his seed, but God renewed the promise (Gen. xv.). His first son Ishmael was b. to him by Hagar, the Egyptian maid (Gen. xvi. 1). In his hundredth year, God changed the name of Abram, 'exalted father,' to Abraham, signifying that he would be the father of many nations (Gen. xvii. 5), and in her ninetieth year Sarai's name was changed to Sarah, and she was assured of a son, whereat A., incredulous, laughed. This suggested the son's name Isaac, from the Heb. verb 'to laugh.' When A. was told by the Lord of the impending destruction of Sodom, he interceded, and going up to the scene of the intercession, he saw the smoke of the burning cities ascending like that of a mighty furnace (Gen. xix. 27). At the appointed time Isaac was b. (Gen. xxi. 1), and Ishmael and his mother were driven away (Gen. xxi. 8). At Beer-sheba an alliance was arranged between A. and Abimelech, the Philistine king (Gen. xxi. 22). While sojourning in the Philistine country, A.'s faith endured its sternest test by the command to slay in sacrifice his son Isaac (Gen. xxi.). Sarah d., and A. bought the cave of Machpelah as a burying-place; and realising his approaching end sent for Rebekah as a wife for Isaac (Gen. xxiv.). A.'s second wife was Keturah, by whom he had 6 sons (Gen. xxv. 1). At the age of 175 he d., and was buried by Isaac and Ishmael in the cave of Machpelah (Gen. xxv.). A. is known as 'The Friend of God,' and ranks not only as the great ancestor of many peoples, but as the 'prophet' (Gen. xx. 7) through whom the revelation was begun; as the founder of that religion which was to gather all nations within its scope.

**Abraham**. Altar of the black stone 'given by Gabriel to Abraham,' in the kaaba or sacred shrine of the Mohammedan religion in Mecca. It is placed in



the S.E. wall of the kaaba at such a height that it may be kissed by the devout pilgrim.

**Abraham, Plains of, or Heights of,** near Quebec, Canada. Here was fought the battle of the Heights of Abraham, 1759, between the Fr. under Montcalm, and the Eng. under Wolfe. The Fr. were defeated and Canada became a Brit. possession.

**Abraham a Sancta Clara** (1644-1709), whose real name was Ulrich Mejerle, was b. near Moskirch, Swabia, Germany, and d. at Vienna. He was a very popular Ger. preacher, joined the Augustinians, became court preacher at Vienna, went to Craz, but afterwards returned to Vienna. His sermons are full of imagination, but nevertheless contain sound doctrine. Schiller's *Wallenstein's Lager* was inspired by his sermon, 'Up, up, ye Christians!'

**Abrahamites:** (1) a sect of Syrian heretics, said to be allied to the Paulicians, who denied the divinity of Christ. Their founder was Ibrahim, or Abraham, of Antioch. (2) A sect of Bohemian deists, who claimed the original religion of Abraham. They denied the Trinity, and accepted from the Bible only the Ten Commandments and the Lord's Prayer, declaring themselves followers of John Huss. Joseph II. transported them to Transylvania in 1783.

**Abraham-men,** a cant term used for hoggars who wandered about the country. They existed from the time of Shakespeare, and in order to excite pity or fear appeared to be lunatics, dressed themselves in rags, and made themselves appear ridiculous. They called themselves 'Poor Tom,' and when caught pilfering claimed to be 'Tom o' Bedlam.' (See Dekker's *Belman of London*, 1608.) One of the wards in Bethlem Hospital, London, was for lunatic beggars, and was named after Abraham.

**Abraham's Bosom,** a metaphorical expression to denote the abode of bliss for the soul after death, used by Christ in the parable of the Rich Man and Lazarus. At the time of Christ it was the custom for the Jews to recline on couches during meals, so that necessarily the head of each guest lay towards the breast of his neighbour, and the expression was derived from this custom as denoting absolute repose.

**Abbranchiata** (from Gk. *ἀ-, without*, *βράχια, gills*), several different groups of animals which either have no gills or have them hidden. Among vertebrates it distinguishes mammiferous animals, birds, and reptiles from fish and amphibious animals.

**Abrantes,** a tn. near the banks of the Tagus, in Estremadura, Portugal. It was taken by Junot in 1807, and is strongly fortified. It trades in corn, oil, and fruits. Pop. 7215.

**Abrantes, Duc and Duchesse d',** see JUNOT.

**Abrasives** (from Latin *ab, away*, *radere, to scratch*), mineral substances used for polishing and grinding, e.g. emery, sand, pumice, grindstone, millstones, corundum, rouge, and garnet.

**Abraxas,** a name devised by the heretic Basilides, containing those Gk. letters which, according to the numeral system then in use, stood for 365, and expressing the all-pervading spirits of the universe. The word was engraved on gems among the ancients, and the term is also used for a stone or gem thus engraved.

**Abrazite,** see PHILLIPSITE.

**Abrogation:** (1) In canon law the annulling of any previous law either by decree or disuse. (2) In Eng. law the reversion or repeal by a higher legislative authority of the order of a subordinate court.

**Abrus,** a genus of shrubs of sub-order Papilionaceae of order Leguminosae, growing in Egypt and India. *A. precatorius*, wild liquorice, is a W. Indian plant, the seeds of which are scarlet tipped with black. They are used as weights, and are strung together into necklaces and rosaries, whence they obtain the name of 'prayer-beads.'

**Abruzzi, Luigi Amadeo Giuseppe Maria Ferdinando Francesco di Savoia-Aosta, Duca di** (1873-1933), son of Amadeo, Duke of Aosta, was b. at Madrid. He ascended Mt. St. Elias, in Alaska, in 1897; beat Nansen's record in his polar expedition of 1900; ascended highest peaks of the Ruwenzori Mts. in Central Africa, in 1906; Mt. Kenya in Brit. E. Africa in 1909. He commanded an It. squadron during the Tripolitan war of 1912 and sank the Turkish torpedo boats off Epirus. In 1913 he was made commander of the It. Navy, and assumed active command in 1915 when Italy intervened in the First World War, his navy comprising 4 dreadnoughts, 10 older battleships, and numerous smaller craft. He continued in command till 1917, when he retired through disagreement with his staff. His writings include *The Ascent of Mount St. Elias*, 1900; *Farther North than Nansen*, 1901; *On the 'Polar Star' in the Arctic Sea*, 1903; *Ruwenzori*, 1908.

**Abruzzi e Molise,** a group of provs. of S. Italy, including the central portion of the Apennines, area 5951 sq. m. The highest peaks are covered with snow for most of the year; they culminate in the Monti Sibillini (8130 ft.), the Gran Sasso d'Italia (9560 ft.), and the Maiella (9120 ft.), and abound in fine scenery. The valleys are fertile and watered by numerous streams flowing into the Adriatic. They produce corn, rice, oil, almonds, and wine, and there are many flocks of sheep. The extensive woods have large herds of swine and the hams and sausages are famous. The coast on the Adriatic is flat and monotonous and there are no good harbours. There are no large tns. Pop. 1,600,600.

**Absalom,** the third son of David and Maacah, daughter of the king of Geshur, compassed the death of his brother Amnon, but was, after a long exile, pardoned by his father. He was able, ambitious, and much praised for his beauty. He provided a bodyguard for himself (cf. Pisistratus, Herodotus i. 59); and prepared the way for a revolt by cunningly cultivating the goodwill of

the people. After 4 years he raised his standard at Hebron, and had great success. Even David of the lion-heart fled to Mahanaim beyond Jordan. In his revolt against David, A. was aided by Ahithophel; but Hushai, David's friend, joined A. to defeat the plan of Ahithophel. Ahithophel, seeing his counsel ignored, hanged himself. David sent a force to meet A., who was routed in the Forest of Ephraim, caught by the head in the branches of a terebinth, and was slain by Joab, in spite of the king's order to 'deal gently' with him. David's lament for his son is one of the most pathetic in all hist. See 2 Sam. iii. and xlii.-xlviii.

**Absalom** and Achitophel, title of a political satire by Dryden (1681).

**Absalon**, or Axel (1128-1201), was b. in the is. of Seeland, Denmark, became archbishop of Lund (1178), and minister to Waldemar I. and Canute VI. of Denmark. He took an active part in helping with the legislation of Waldemar, and drove the Wendish pirates from the country. Under Canute he helped to overthrow Bogislaw of Pomerania. Besides a great statesman and general, he was a lover of art and learning, assisting Saxo Grammaticus with his great hist. of Denmark. He built a castle which was the nucleus of the city of Copenhagen.

**Abscess**, a collection of pus or matter as the result of bacterial inflammation. When injurious germs gain access to any part of the human body, the white blood-corpuscles rush to engage in a struggle with the invaders. If the blood is not in good condition, the hostile germs are not quickly destroyed and multiply at a great rate. The contest then proceeds until there is formed a creamy mass of dead corpuscles and bacteria which is known as *pus*. This may be absorbed into the blood stream by other corpuscles, but is more frequently discharged by the disintegration of the covering tissue.

The usual treatment consists in promoting the discharge of pus by poulticing and lancing, or, in the case of a deep-seated A., by draining through a tube.

**Abscissa**, the distance of a point from some fixed line, measured horizontally. With rectangular co-ordinates, it is the distance of a point from the Y or vertical axis measured parallel to the X or horizontal axis. See CO-ORDINATES.

**Absconce** (from Lat. *abscondere*, to hide), a small lantern, of anct. origin, used in the Rom. Catholic Church during the performance of the night offices.

**Absentee**, a term applied to one who receives rent from an estate which he spends in another country. Also sometimes applied to one who draws a salary from an office without performing its duties. The effect of absenteeism is twofold, moral and economic. With regard to the former there can be very little doubt that the introduction of middlemen, or agents, tends to lessen the sense that property owners have obligations as well as privileges. Also the property owner by absence loses that personal touch between owner and tenant which tends to promote community of interest.

The economic result of absenteeism has been the subject of much debate among political economists, but there seems to be a general consensus of opinion among them, as there certainly is in the popular mind, that the A. by spending his money abroad is depriving the industries of his own country of support. On the other hand, it is argued that the A. still indirectly supports the industries of the homeland, for there must be an export of goods from his native country equivalent to the amount of goods he consumes, otherwise his remittances could not be made to him. To absenteeism much of Irish poverty has been attributed, and Acts were passed in the reigns of Richard II. and Henry VIII. to check it.

**Absinthe** (from the Gk. *ἀψινθιον*, wormwood), the name of a spirit, chiefly manuf. and consumed in France, but also distilled in Switzerland (especially in Nouchâtel). It is a sort of cordial, and on the average contains sometimes as much as 80 per cent of alcohol. Its distinctive flavour comes from the bitter essential oil of wormwood (*Artemisia Absinthium*), which is the chief among other essential oils, such as those of angelica root, star-anise, of which it is compounded. A. is green in colour, which is due to the maceration of the liquor with spinach, parsley, or other herbs. The naturally deleterious effects of A. are heightened by the adulteration of the liquor by indigo. Absinthism, or the physical derangement induced by excessive indulgence in the liquor, was formerly common in France. The symptoms include horrible dreams, hallucinations, and other nervous disorders, and if indulgence is persisted in, end in idiocy or paralysis. Emile Zola in *L'Assommoir* gave a terrible and realistic account of the evils of A. poisoning. A. was formerly used in the Fr. Army, especially during the campaign in Algeria, for its supposed efficacy in cases of fever, but its use has now long been discontinued, and both the manuf. and sale of A. are now forbidden by law in France.

**Absolute**. Its adjectival signification is opposed to relative, contingent, or conditioned; the result of the highest abstraction. Thus it has come about that in its substantial sense it has been regarded by some as the fundamental principle and cause of all being, *τὸ ὄν*, while others (notably Hamilton and Renouvier) regard it as a fantastic conception—a pseudo-idea. These differences of opinion arise from the fact that our minds can only regard anything relatively which is opposed to the principle of the A. That the A. is the all-pervading, unconditioned, and necessary principle of all things is the basis of the philosophy of Descartes, Spinoza, Schelling, and Hegel, while Kant holds that the mind cannot form an idea of the A. Perhaps it is best to regard it as what is constant, invariable, and necessary in the relation between one idea and another—as that which could not be other than what it is whether regarded subjectively or objectively.

In physics *A.* velocity is rate of motion through space as opposed to relative velocity, which is the rate with which 2 objects approach or recede from each other. In grammar *A.* signifies independent of any other part of the sentence, as nominative *A.* *A. gravity* is the gravity of a body viewed apart from all modifying influences, as, for instance, of the atmosphere; and, to ascertain its amount, the body must, therefore, be weighed *in vacuo*. *A. motion* is the change of place on a body, produced by the motion so designated, viewed apart from modifying influence arising from disturbing elements of another kind. *A. numbers* are those which stand in an equation without having any letters combined with them; thus, in the following equation

$$5x + 11 = 31$$

11 and 31 are *A. numbers*, but 5 is not so.

**Absolute Alcohol**, see ALCOHOL.

**Absolute Magnitude**, in astronomy, a term applied in contradistinction to the 'apparent' size of stars viewed from the earth. In other words, it implies the luminosity of the star irrespective of its distance, and, mathematically, it is the number expressing, in accordance with the usual system of stellar magnitude, the brightness of the star as it would be if it were at the distance of 10 parsecs—parallax 0.1". If the distance of any given star be known, its *A. M.* can be calculated from its apparent magnitude; or, again, if the *A. M.* and apparent magnitude be known, the actual distance of the star can be determined; the numerical relation between the absolute (*M*) and the apparent (*P*) being  $M = P + 5 + 5 \log_{10} r$ , where  $r$  is the decimal fraction of a second of arc that indicates the parallax. The nearer stars are not necessarily the brighter, nor are the apparently bright stars necessarily very bright intrinsically. A star of *A. M.* emits as much light as the sun; one of *A. M.* 0, a hundred times as much, and one of -5, ten thousand times as much. For the various magnitudes of Ptolemy and the cataloguing of stars according to magnitude, see under MAGNITUDE.

**Absolute Monarchy**, see ABSOLUTISM.

**Absolution**, a religious ceremony by which the Christian priest declares an individual, on repentance and submission to the requisite penance, to be absolved either from his sin or from the eccles. punishment to which it rendered him liable. Since the twelfth century the formula used in the Rom. Catholic Church has been: 'Ego te absolvo a peccatis tuis' (I absolve thee from thy sins), accompanied with the sign of the cross. The Council of Trent has expressly condemned (Session xiv. Canon 4) the doctrine that the priest has not power of himself to absolve from the guilt of sin. The Church of England also holds, as may be seen in the Order for the Visitation of the Sick, that power has been left with the Church to absolve repentant sinners, and the words that

the minister uses are the same as those employed in the Catholic communion: 'I absolve thee from thy sins.' In the Protestant Church of Scotland, the term *A.* is commonly used to denote simply the declaration of the Kirk session, or other judicatory, expressed by the mouth of its president, that the party is released from the eccles. interdict to which his delinquency had subjected him; this approaches the original use of the word with the early Christians.

**Absolutism**, the form of gov., as opposed to constitutionalism, in which the king or ruler is the supreme head, responsible to no parliament and having no constitutional check. But *A.*, as it existed in the Middle Ages, did not exist in modern times until its reappearance with the dictatorial or 'leader' states of Germany and Italy. In the Middle Ages *A.* was a necessity in order to centralise the strength of a nation for self-defence, and to remove the power of the feudal lords by turning them from autocrats into courtiers. A typical absolute monarch was Louis XIV. Continental *A.* of the seventeenth century had not the anti-democratic character of modern Fascism; it buttressed the central power at the expense of the nobility. Indeed, it styled itself 'benevolent' or 'enlightened' *A.* See GOVERNMENT.

**Absolutists**, a Sp. political party opposed to the constitution of 1812. They wished to restore to the Crown its lost absolute powers, and were opposed by a party called the Exaltados. Subsequently the *A.* supported the pretensions of Don Carlos against Queen Isabel.

**Absorption**, the process by which one substance is sucked up by another. When a liquid is absorbed by such a substance as blotting-paper, the action depends on capillarity (q.v.). Plants are enabled by their root fibres to absorb liquid matter into their tissues. In the process of digestion, the intestines absorb compounds necessary for the nutrition of the body. Cutaneous *A.* means the sucking up by the skin of oily materials; this occurs when ointments are used. The term *A.* has also some special applications in physics.

*A. of gases by liquids*.—Gases may be absorbed or dissolved by liquids. The solubility of different gases in water varies considerably. One vol. of water at 0° C. and atmospheric pressure absorbs only .02 vol. of nitrogen, whilst ammonia at the same temp. and pressure dissolves to the extent of 1050 vols. to 1 vol. of water. The weight absorbed increases in proportion to the pressure (Henry's Law), but decreases as the temp. increases, though not in exact proportion.

*A. of gases by solids*.—Some solids also have the property of absorbing gases, the best known example being charcoal, which can absorb large quantities of ammonia, chlorine, phosgene, and other gases. To this power of absorbing gases charcoal owes its efficacy as a deodorant. After heating in superheated steam, charcoal becomes even more efficient and

absorbent, and is said to have been 'activated.' Active charcoal is used in gas masks. Platinum black, if surrounded by a mixture of hydrogen and oxygen, absorbs so much of the gases, and therefore brings them into such intimate molecular contact, that sufficient heat is given out to ignite the rest of the gas. Scientifically, A. is distinguished from adsorption, the 2 together being known as sorption. Adsorption implies the taking up of a gas by the surface layers of a solid, while A. implies the taking up of the gas by the interior of the solid. Hence adsorption always precedes A.

**A. of light and heat.**—Wave motion in the ether, certain kinds of which produce the sensations of light and heat, is liable to be interrupted by intervening substances. Some rays may be transmitted with more or less disturbance of direction, some may be reflected, and some may be absorbed; that is, work is done on the particles of the intervening substance, and its temp. rises. A particular substance may absorb rays of certain frequencies, allowing the others to be transmitted or reflected. The long, slow waves produced by electrical methods can pass through thick, opaque obstacles without being absorbed. The quicker heat waves are absorbed readily by dark substances such as lamp black, whilst the various wave-lengths which correspond to the different colour sensations are variously affected by different substances, the result determining the colour as seen by transmitted or reflected light. In green glass, for example, only green rays are allowed to pass through, the other components of the white light which enters the substance being absorbed and converted into heat. What light is reflected is white, so that if green glass be ground up it reduces to a white powder; similarly, the foam of a transparent green liquid is white. Even reflected light penetrates the surface to some extent, and the amount of penetration has an effect on the character of the A., and consequently on the colour of the reflected light. Gold, for instance, reflects white light at the surface, and also light which by A. before it comes to the surface is orange. In the interior of a gold vessel we get repeated reflection, which means repeated A., and the resultant colour is a deep orange.

**A. bands** are dark lines in the spectrum of light transmitted through gases. They indicate the absence of the particular wave-lengths absorbed by the gas, and may vary with the temp. and thickness of the same gas.

**Abstinence**, see TEMPERANCE; **BAND OF HOPE MOVEMENT**.

**Abstract.** In law, the brief statement of the prin. fact in a document—used now generally with relation to the purchase of land—the A. being furnished by the vendor to the purchaser; in time, it now extends back 30 years, and traces the devolution of title, legal and equitable, of the land in question. If not satisfactory, the purchaser must object

within a certain period. See further *under* VENDORS AND PURCHASERS.

An A. thought or term has regard only for qualities or essences without reference to individual or particular things, *e.g.* wisdom.

Abstraction is an act of the mind by which it directs its attention to particular attributes of an object or objects without regard for the other attributes which the object may possess. Thus in the objects *coal, pitch, negro*, we see the quality of *blackness*, and this we may abstract from the other qualities or attributes in the objects and consider it independently. All names of classes, inasmuch as the individual members cannot be identical, are formed by a process of abstraction—thus the word *ship* connotes a certain number of attributes, and all objects possessing these attributes fall under the heading ship. The higher the abstraction the greater number of objects embraced. Thus the term *object* includes a multitude of abstractions. Abstraction, then, is formation into classes and species. The highest abstractions are *time, space*, and *being*. Abstraction involves such generality that A. reasoning is apt to be fallacious if attention is not held continually to concrete objects. See GENERALISATION.

**Absurdum, Reductio ad**, the argument which proves not the thing asserted but the absurdity of everything that contradicts it: used in geometry to demonstrate the converse (see CONVERSE) of a proposition already proved. It is perhaps not so satisfactory as the direct proof and certainly not so elegant, but it is obvious that if everything which contradicts a proposition is false, the proposition itself must be true.

**Absyrtus**, or **Apsyrtus**, son of Æetes, king of Colchis, who with his sister Medea fled with Jason. Medea killed her brother and strewed his dismembered limbs on the road so that the pursuing Æetes might be delayed gathering them.

**Abt, Franz** (1810–85), Ger. composer of song-music, who wrote upwards of 200 songs, the most celebrated being *When the swallows homeward fly*.

**Abu Abdullah Mohammed**, see IBN BATŪTA.

**Abu-Bekr**, father-in-law of Mohammed, first caliph of Islam, *b.* at Mecca circa 572, *d.* and buried at Medina, 634. The beginning of his caliphate was beset with trouble, as he had to overcome the opposition of the partisans of Ali, the prophet's son-in-law, and also bring back to the faith some of the tribes who had relapsed into heathenism. In addition, he had to suppress numerous pretended prophets, notably Mosaylima. This he did with the able assistance of his 2 lieutenants, Omar, who succeeded him, and Khalid. After a victorious campaign against the Byzantine emperor Heraclius, in which he added Syria and part of Persia to his dominions, he *d.* on the day of the fall of Damascus. It was A.-B. who first collected the oral and written precepts of Mohammed and

embodied them in the Moslem sacred book, the Koran.

**Abu Klea**, Sudan, vii. on the route from Korti to Metemma, where an Eng. army under Sir H. Stewart defeated the forces of the Mahdi, Jan. 17, 1885.

**Abulfaraj**, or **Abulpharagius** (1226-86), a celebrated oriental writer; b. at Malatlia in Armenia of Jewish parents, he early embraced Christianity. Became bishop of Gubos at the age of 20, and later of Aleppo. In 1266 was elected primate of the Jacobite Christians. A. was a great linguist, and himself trans. many of his works. He wrote a commentary on the Syriac version of the Bible, but his chief title to fame rests on his general hist. of the world from the creation down to his own time. It was called *The History of the Dynasties*, and the parts dealing with the Mogul Tartars and the conquests of Genghiz Khan are of great value.

**Abulfeda** (1273-1331), Moslem prince, b. at Damascus, and while a youth distinguished himself in the campaigns against the crusaders and the Tartars. The Mameluke sultan Nasir raised him to the rank of king in 1310 by conferring on him the kingdom of Hama, which he ruled as an independent ally of Nasir. Of his numerous works the 2 best known are a universal hist. and a treatise on geography. The hist. is of special value, and one of the chief sources of information concerning the Saracens. Part of the work which treats of the hist. of Islam was trans. into Lat. by Reiske and ed. by Adler (Copenhagen, 1789-91) in 5 vols.

**Abul Majd Majdud ben Adam**, see SANA'I.

**Abu-Maaschar**, see ALBUMAZAR.

**Abu Nuwas** (c. 760-810), lyric and erotic Arabian poet of partly Persian descent. Educated at Basra, he spent 1 year in the desert among the Arabs, and later lived under the protection of Caliph Harun al-Rashid in Bagdad. The *Divan des Abu Nuwas*, trans. by A. von Kremer, was pub. in Vienna in 1855; in the original in Cairo in 1860, and in Beyrout in 1884.

**Abu Ul-Maarri** (973-1057), Arabian poet, letter-writer, and lecturer. Attended the lectures of the best contemporary teachers at Aleppo, Antioch, and Tripoli. Developed advanced views on vegetarianism and cremation. Works include poems under the title *Saqi uz-Zand*; later poems, the *Luzumiyat*; and a collection of letters ed. and trans. by D. S. Margoliouth (1898).

**Abuse**, a legal term. *A. of Distress*, i.e. in an irregular manner to make use of goods distrained on, as, for example, working a horse, which is an offence which makes the offender liable to an action for damages. *A. of Process*, i.e. the bringing of vexatious actions, is guarded against by certain rules of the Supreme Court, notably Order XXV., Rule 4, and by the Vexatious Actions Act, 1896. By the former rule a court can dismiss an action which appears to be of a frivolous nature, and by the

latter Act, on an application made by the attorney-general, any person who habitually institutes legal proceedings without reasonable cause may be restrained from so doing by an order of the court. By the common law of England any sufferer from a malicious action either in the criminal or bankruptcy court has the right to bring an action to recover damages.

**Abushehr** or **Abushire**, see BUSHIRE.

**Abu-Simbel**, see IPSAMBUL.

**Abutilon** (Arabian *aubutilun*), or Indian mallow, a genus of plants belonging to the Malvaceæ, of which 80 species are known. They are tropical or semi-tropical, but during the warmest part of the year may be grown in the open air in England. *A. Avicennæ*, or velvet-leaf, is grown largely in China for jute.

**Abutment**, a technical term used in architecture to denote that part of an arch which receives the lateral pressure, and in machinery to indicate that point at which resistance is obtained. Thus the breech of a gun, the end of a steam cylinder, are the As. to the explosive or expanding force.

**Abutials**, the buttings or boundaries of land or of a parish. The ceremony of 'beating the bounds' sometimes performed consists in a priest making a tour of his par. and striking each abutial with a wand.

**Abydenus**, Gk. historian whose hist. of Chaldaea, or Assyria, has been lost except for some fragments quoted by Eusebius and other of the early Fathers of the Church. The time at which he lived is uncertain, but certainly not anterior to 250 B.C.

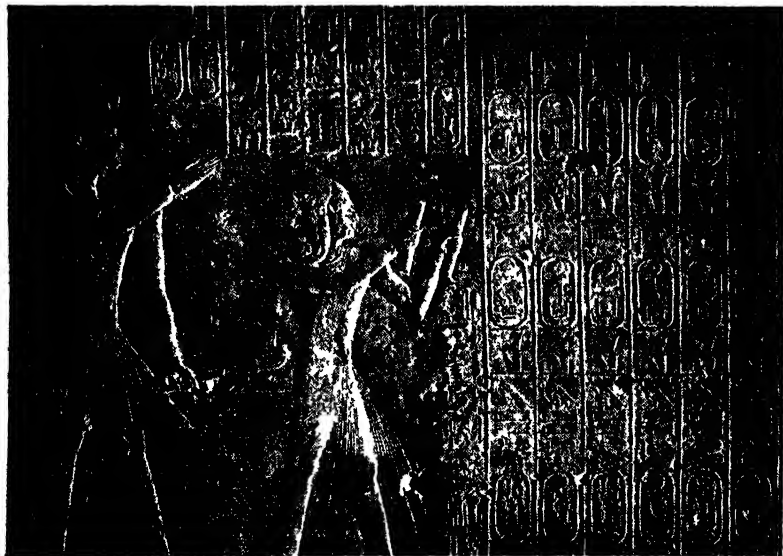
**Abydos** (1) anct. tn. on the Asian shore of the Hellespont, or Dardanelles. Facing it on the European side was Sestos. Here it was that in 480 B.C. the Persian monarch Xerxes built his famous bridge of boats to enable his immense army to cross. The bridge was described by Herodotus, and was nearly a mile long. A. will always be remembered for its association with the legend of Hero and Leander. Byron in his poem *The Bride of Abydos* recalls this story. See Herodotus, II. 134-39, 261. (2) Next to Thebes the most important tn. in the anct. kingdom of Upper Egypt. Here in a small ruined temple was discovered in 1817 the 'Table of A.', so important to Egyptological research. This contained a genealogy of the early kings of Egypt. (See illustration, p. 34.)

**Abya**, or **Abila**, one of the Pillars of Hercules on the African shore of the Straits of Gibraltar.

**Abyssal** (from Gk. *a-*, without, *βυσσός*, bottom) Fauna is one of the 3 divs. of marine fauna, the others being littoral or shallow-water, and pelagic or surface fauna. They exist in the greatest depths of the ocean, and when brought to the surface their bodies are always shattered owing to the diminution of pressure. The uniform coldness of temp., the total absence of light, and the enormous pressure of water naturally cause great

modifications among them. Many are blind, while others see by means of the phosphorescent glow emitted from their own bodies and those of other fish. Their organs of touch are frequently highly developed. As no plants

colony of Eritrea, on the W. the Sudan, on the S. Kenya and Uganda, and on the E. Fr. and Brit. Somaliland. Its N. and E. neighbours cut it off from access to the Red Sea, from which it is distant some 40 m. along the greater part of the



THE TABLE OF ABYDOS IN THE TEMPLE OF SETI

W. L. Mansell

can grow in the abyssal depths because of want of light, the fauna are carnivorous, catching in their wide jaws the falling debris of the organisms which exist above them. In colour they are very vivid; scarlet, violet, orange, and purple being the predominant colours, but not blue. The chief A. F. are echinoderms and sponges, while there is a noticeable scarcity of crabs, molluscs, corals, and annelids.

In their discovery, the researches of H.M.S. *Challenger*, sent out 1872-76 by the Brit. Gov., are invaluable. See H. N. Moseley, *Notes by a Naturalist on the Challenger*, 1879; Sir Chas. Wyville Thomson and Sir John Murray, *Reports on the Scientific Results of the Voyage of H.M.S. Challenger 1880-96*; F. B. Sumner, *Intensive Study of Fauna and Flora of Sea Bottom*, 1908; J. Murray and J. Hjort, *The Depths of the Ocean*, 1912; J. A. Thomson, *Haunts of Life*, 1921.

Abyssinia, an independent inland country of N.E. Africa (forming, between 1938 and 1941, part of It. E. Africa). It is situated between 5° and 15° N. lat. and 35° and 42° E. long. Its boundaries are, on the N. the It.

Eritrean boundary. Its area is estimated at 350,000 sq. m., with an estimated pop. of 7 to 8 millions, of whom less than one-half are Abyssinians and the remainder Gallas (q.v.)—negro tribes on the W. and S. frontiers—and on the E. Danakils and Somalis. The name A. is derived from *habesh*, meaning mixed, on account of the varied nature of its peoples; but, among the inhab., the whole country used to be called Ethiopia.

A. is a vast plateau intersected by deeply running rivs., whose beds have been worn to considerable depth, and in this way is shaped masses of land have been formed called *ambas*. A feature of these *ambas* is their almost perpendicular ascent, a characteristic which marks almost the whole of the plateau. The region owes its formation practically to volcanic origin, but, save for a few hot springs, the volcanic action is now extinct. The highest peaks are found in the Simen and Golan ranges. As the slope of the country is least steep towards the W., the majority of the rivs. empty themselves in the Nile. Many, however, of lesser significance, lose themselves in the sand. The Hawash is the chief riv. It rises in Shoa and flows into

Lake Aussa, where further trace of it disappears. This remarkable phenomenon is partly explained by the great depth below sea level of the lake. Compared with smaller and neighbouring lakes the Aussa is almost fresh, while salt is present in the others to such a degree that it deposits a crust round the edges. The R. Abai, which forms the Upper Blue Nile, reaches that riv. through Lake Tsana. The Takazzé joins the Nile, changing its name, on nearing the confluence, to that of Atbara. The Moreh flows into Nubia, but disappears later in the sand. Of all the physical features of A. the Lake Tsana is the most arresting. It is 60 m. long and presents a most striking picture. A new lake, some 9000 ft. above sea-level, in the crater of an extinct volcano, was discovered in 1931 by Amer. surveying engineers and named Lake Southard in honour of the Amer. minister to Addis Ababa.

Generally speaking, the climate of A. is temperate and fairly salubrious, owing to the practically uniform elevation, though in some parts a very wide range of temp. is covered during the day. The weather conditions may be divided into 3 periods, the cold season, from Oct. to Feb.; the hot, dry season till June, and the rainy season for the rest of the year. Rain is an important factor in A., as the Nile depends for its flood entirely upon its Abyssinian tribes. The climate is conducive to the luxuriant growth of the following trees: date-palm, mimosa, giant sycamore, gum (in many varieties), pine, fig, orange, pomegranate, peach, apricot, and banana. Among the smaller plants, cotton, indigo, and the sugar-cane grow in profusion. In the Kaffa country coffee is indigenous, and is believed to take its name from that region. The staple food of the community is to a large extent dependent upon a regular supply of honey, a fact which gives bee cultivation much impetus. Abyssinian crops suffer considerably from swarms of locusts which visit the country periodically.

After incorporation of A. within the It. Colonial Empire, It. E. Africa was divided into the following separate provs., each of which included a part of A.: Eritrea, which extended to Danakil; Amhara (cap. Gondar), which comprised Amhara, Gojam, and a part of Shoa; Galla and Sidama (cap. Jimma), which included the W. part of A. as far as the Sudan; Harar (cap. Harar), which includes the Moslem pop. of Harar, Arussi, and Bali. In 1938 a royal decree estab. the new Gov. of Shoa, but in 1941 the Ethiopian Gov. returned to Addis Ababa. Prior to the It. conquest in 1936 the political divs. of A. comprised a number of provs. and dependent states. The former contained Tigré in the N.E., Amhara in the centre, Gojam enclosed in a great sweep of the Abai, and Shoa on the E. of the Abai; while among the many dependent states were the Wallagas, Harar, Kaffa, Gallaland, and Central Somaliiland. After the It. annexation

had removed the Abyssinian throne as an object of the ambition of the rival chiefs, an increasing measure of Abyssinian unity, hitherto rendered impossible by the relationship between the emperor and the great chiefs, might have been expected in course of time. The emperor was restored by the Brit. in 1941 and now rules under Brit. advice, with the result that the Amharas will no longer exercise oppression over their former subject peoples of the S. and W., and those of non-Amharic race will have equal opportunities with those traditionally accustomed to rule, and the people as a whole will no longer be divided into warriors and slave-owners on the one side, and serfs and slaves on the other. The only large tn. of A. is Harar, of Arab origin. Periods of incessant warfare, and the frequent exhaustion of natural productions, account for the non-existence of large tns. The cap. of A. is Addis Ababa, in Shoa; other tns. are Adua or Adowa (the cap. of Tigré), Adigrat, Macalle, and Antah, in Tigré; Dire-dawo, Goré, Jimma, and Debra Markos (the cap. of Gojam); Magdala, Debra-Tabor, and Sokota (at the confluence of the old trade routes), in Amhara, and Dire-dawo, Debra-Derhan, Aliu-Amber, and Ankober, in Shoa; Leika in Gallaland, and Bonga in Kaffa; and Gondar, Aksum, Antalo, and Ijube. There are ant. architectural remains at Aksum, Gondar, and Ankober. Most of the transport of A. has hitherto been carried on by means of pack animals, so few of the roads are fit for wheel traffic. Many m. of macadam road were constructed in the neighbourhood of the cap. a few years ago. A railway links Addis Ababa, via Dire-dawo, with Jibuti (Fr. Somaliland), 488 m. away. Telegraphs and telephones connect the cap. with Harar and other places. The soil is extremely fertile. In fact Egypt owes all the richness of its own soil to the sediment brought down by Abyssinian rivs. Agriculture is followed on a large scale. In the hotter regions sugar-cane and coffee flourish: in the middle zone, maize, wheat, barley, wild oranges, potatoes, and tobacco are grown, and, above 6000 ft., there are good mules, donkeys, goats, oxen, sheep, and pastures and corn cultivation. Horses, camels are a large part of the wealth of the people. The chief exports are coffee, civet, hides, gold, and wax. A. is reputed to contain some mineral resources; iron is found, and gold is washed in various streams; while salt, saltpetre, platinum, and sulphur are to be procured. Commercially, A. remained for a long time in a backward state, and not until the twentieth century, under the enlightened and wisely directed energy of Menelik II., was any effort made to advance its interests. Foreign undertakings gradually obtained a footing in the country in the cultivation of coffee. The annual value of Abyssinian trade is estimated at approximately £2,500,000. A big trade is done with the Sudan,

principally in hides, coffee, and shea butter.

The former Gov. of A. was feudal in its methods of administration. The princes possessed powerful influence, and formed a council in an occasional meeting called by the emperor. Two consultative organs of gov. were set up by the Its.; the General Assembly and the Council (*Consulla*), of which 6 native chiefs were members. The Abyssinians, properly so called, number less than 4 millions, and inhabit Tigré, Gofam, Amhara, and part of Shoa. The Gallas, mixed Christians, Pagans, and Muslims, number over 5 millions. In character the Abyssinians as a whole are indolent, easily appeased when offended, vain, and selfish. Morally they are lax, and marriage laws are lightly regarded. Indeed, polygamy is a common practice. Their religion consists of a less enlightened Christianity, and since their conversion in the fourth century they have kept their connection with the Alexandrian Church through a Coptic head bishop. The Danakil profess Mohammedanism.

In early times A., or more correctly Ethiopia, was closely connected with Egypt. Legends trace their origin so far back as a descent from the tribe under the queen of Sheba, their ruler. The kingdom was subjected to the sway of the Hebs. and the Gks. successively. Christianity was introduced about A.D. 330. The actual hist. begins with the kingdom of Axum. Relations with the civilised world were severed after a Mohammedan conquest of the country in the middle of the seventh century. In A.D. 1000 a general massacre was carried out by Princess Judith of all the royal family. The infant king, however, was safely conveyed to Shoa. Here he was welcomed, while the rest of the country was ruled by Judith. In 1268 the country was regained by the royal house, the reigning monarch being Tekunō Amtak. Portuguese attention was directed to A. in the fifteenth century. A settlement resulted, and lasted 6 years, the royal family accepting the Roman Church. In 1634 a rising against Rom. dominance resulted in the resignation of the negus (king) in favour of his son. A state of general confusion followed, no emperor being recognised. In 1769 Michel Sobul, the king of Tigré, installed himself as Ras (Prime Minister) over A., after assassinating Joas, the reigning monarch. A Galla chief soon overthrew him and assumed the position of sovereign, a dignity which eventually reached his grandson, Ras Ali. In 1850 a native of Amhara named Kassai, afterwards Theodore, defeated the Ras, and, marrying his daughter, proclaimed himself governor. Three years later he conquered all opposition and installed himself as negus of A. He received assistance in governing from 2 Englishmen, who were killed in a rising in 1860. His rule now developed a tyrannical character, and so severe became his administration that a general

rebellion spread all over the country. It was put down with merciless cruelty. Failure to secure European aid aroused a violent antipathy to Europeans, and Brit. and foreign envoys and missionaries were imprisoned. Peaceful overtures to obtain their release proved futile, and an expedition under Napier landed in 1868. The ill success of Theodore compelled him to treat for peace. He refused personally to surrender, and committed suicide within the fort he had failed to defend. No sooner had the Brit. left, than renewed strife broke out among the various chiefs for the crown. Prince Kassai of Tigré was successful in proclaiming himself emperor, though he failed to control insubordination among the various states. Meanwhile the Egyptians had become his enemies. An engagement resulted in such terrific slaughter that the parties mutually retired, and till 1882, when the Sudan was abandoned by the Egyptians, the difficulties of demarcation proved very troublesome. The Its. in 1885 occupied Massowah, and afterwards estab. friendly relations. Four years later Negus John II. died, and Menelik of Shoa became emperor. In a treaty Italy assumed control of Abyssinian affairs, the empire becoming an It. protectorate. In 1893 a rising under Menelik resulted in Abyssinian independence. Following the ratification of the treaty, European missions were dispatched, and an agreement was concluded with the Brit. With the exception of Somaliland, however, the question of frontier was judiciously avoided. In 1899 a rebellion under Mahomed Abdullah (the 'Mad Mullah') caused co-operation with the Brit., and although little practical help was rendered, the significance cannot be disregarded of the readiness of A. to accept and request Brit. aid. In 1908 an Anglo-Fr.-It. alliance agreed to protect their individual interests and ters. in the event of further disturbance. (See A. B. Wyld's *Modern Abyssinia*, 1901; Bruce's *Travels*, 1801; Mountnorris's *Voyages*, 1809-11). King Menelik d. in 1913, and was succeeded by Lij Yasu, his grandson, who, coming under Ger. influence in the First World War, was deposed by public proclamation in 1916, and Walzeru Zauditu, a daughter of Menelik, was nominated and subsequently crowned empress. At the same time Ras Tafari, a great-nephew of Menelik, was proclaimed heir to the throne, and for some time acted as regent to his aunt. In polity, the Gov. remains essentially feudal in character, but in 1919 a tentative step in the direction of Cabinet Gov. was taken. In 1923 A. became a member of the League of Nations. In 1924 a royal edict was promulgated to provide for the gradual manumission of slaves. The Empress Zauditu d. in Apr. 1930, from Lent fasting following paratyphoid. Her death ended the dual form of gov. of empress and regent, which had never been a success, especially as King Tafari, supported by the more



educated elements in A., had always wanted to develop A. on modern lines. In 1927 he had been proclaimed emperor or king of kings (*negus negusti*) and late in 1930 was proclaimed Emperor Haile Selassie I.

In 1935 Italo-Ethiopian relations began to deteriorate rapidly. It. claims to spheres of influence in A. were put forward half a century ago, but came to nothing after their disastrous defeat at Adowa (Adua) in 1896. At that time the Brit. Gov. recognised the It. zone of influence as extending virtually throughout modern A., but the treaty or accord of 1891 had been superseded

only on certain specified and special conditions, and that in 1935 she might be regarded as no longer possessing the status of a League member, inasmuch as she had ceased to fulfil the conditions (chiefly relating to traffic in arms and slavery) to which her membership was indissolubly linked. (See on this *Documents relating to the Dispute between Ethiopia and Italy*, 1933, Cmd. 5044.) In the previous Dec. (1934) the undefined and contested frontier between It. Somaliland and Ogaden had led to difficulties, particularly the Wal-Wal incident, in which Brit. Somaliland was also involved. On Dec. 5 Ethiopian



HAHAR

A wood market outside the main gate.

by later agreements, and the whole position politically was then governed by a tripartite treaty made in 1906 between Great Britain, France, and Italy—a treaty which, in the It. view, recognised certain territorial adjustments in her favour in exchange for territorial cessions to A. in the region of the Somaliland coast. But the It. defeat at Adowa, coupled with the treaty Italy concluded with A. in 1896 at Addis Ababa recognising Abyssinian independence, excluded, in the view of the other European powers concerned, the possibility of an It. sphere of influence over the whole of A., and determined the basis of the tripartite treaty of 1906. This basis remained unaltered in the view of Great Britain and France in 1935, though Italy had never really relinquished her claims. (See on this G. A. Rossi, *Diritti d'Italia (Ultramar)*, 1916.) A. confirmed her independence by being admitted a member of the League of Nations, and Italy was a consenting party to her admission. Italy's contention, however, was that A. was admitted to membership

troops, which had been in touch with an It. frontier garrison for some days, attacked the It., who withdrew. Later, It. reinforcements, supported by aeroplanes and tanks, repulsed the Abyssinians with severe loss. The It. Gov. sent a note of protest to Addis Ababa, while Haile Selassie, for his part, demanded arbitration in accordance with Article 5 of an Italo-Ethiopian treaty of Aug. 2, 1928. On the refusal of the It. Gov., A. submitted the dispute to the League of Nations. On Jan. 29 a sanguinary encounter took place between It. and Abyssinian patrols at Afdub, S. of Wal-Wal. The It. Gov. again protested and mobilised 2 divs., the one for Somaliland and the other for Eritrea. Further incidents occurred and the Abyssinian Gov., in face of the It. mobilisation, now (Mar. 1935) demanded the application of Article 15 of the League Covenant (q.v.). In May, Mussolini, in the Senate, spoke of the dangers threatening Somaliland and Eritrea and declared that Italy was ready to assume 'even the supreme

responsibility.' Meanwhile, Brit. public opinion, which was overwhelmingly hostile to an It. expedition against A., aroused in Italy both apprehensions and irritation. The compromise proposed by Mr. Eden to Mussolini—a rectification of frontiers to the advantage of Italy, and the annexation of Ogaden, the right to construct a railway between Somaliland and Eritrea, and the cession by Britain to Italy of a passage giving access to the sea and of the port of Zella—was rejected by Italy as wholly inadequate (June). Later (Aug.), Italy rejected proposals put forward by France and Britain following a conference in Paris between Mr. Eden, M. Laval, and Baron Aloisi. In Sept., Baron Aloisi deposited with the League Council a memorandum demanding the exclusion of A. from the League as a country barbarous, disunited, and countenancing slavery; he justified the use of force in order to repress Abyssinian aggression and to establish civilisation in A., and refused even to discuss the memorandum with the Ethiopian delegates to the League. Mussolini was now plainly advertising his intention to invade A.—a move which had been obvious since the grand It. manoeuvres in the Upper Adige of the previous month. Whether Britain and France would have been able and justified in preventing by force this aggressive move by Italy must be left to the verdict of hist., but, at the time, it was generally believed in those countries that neither was sufficiently prepared to risk a major war in Europe, and this in spite of the threat by Italy to Brit. interests in the Mediterranean. Meanwhile a committee of the League was strenuously working to find some solution acceptable to Mussolini. One plan, involving an international police force to organise A., and territorial rectifications in favour of Italy, was accepted by Haile Selassie but rejected by Italy, which was again demanding that A. should be deprived of its domination over various subject peoples which were living on the frontiers of the empire 'under inhuman conditions.' On Oct. 2, the It. troops in E. Africa crossed the Ethiopian frontier and hostilities had begun. The council of the League declared Italy to be the aggressor and this imposed on each Member State of the League the obligation to apply the sanctions laid down in Article 16. (Austria and Hungary refused to join in the sanctions.) Italy protested against the economic and financial sanctions and decided to resort to counter-sanctions (Nov.). Later (Dec.) came the eleventh-hour effort by Sir Samuel Hoare and M. Laval to avert the war. The Hoare-Laval pact was a plan by which Italy was to receive Tigre without Aksum, and the country of the Danakils and Ogaden, while A. was to obtain an outlet to the sea; and a zone for economic expansion and settlement was offered to Italy to the N. of Kenya. The Council of the League and Mussolini alike rejected the plan. The military opera-

tions which had begun on Oct. 3 on the Tigre front had in a week, almost without fighting, estab. 3 It. corps on the positions Aksum-Adova-Adigrat. By early Nov. the It. had reached Makale and the Takazze Riv. After Dec. 15 partial Abyssinian offensives took place, causing the It. troops to fall back on Aksum and Adua. By the end of 1935 the It. front passed through Selaklaka-Aksum-Abbis Adale-Makale. But before that Gen. de Bono had been superseded by Marshal Badoglio, Mussolini being dissatisfied with the slow progress made by the former in the N. Badoglio pursued the campaign in the N. with redoubled vigour, having learned from the fighting at Tembien (Jan. 20-26) that the only way to meet the superior Abyssinian mobility was to attack on a wide front with all the modern essentials of mechanised warfare, including bombing from the air. Graziani's advance in the S. was hampered by the difficulty of bringing up supplies. Demoralisation set in by the end of Apr., and many Abyssinians returned to their agric. pursuits regardless of the campaign, while a great many deserted. Before the end of May, the emperor, Haile Selassie, fled from his cap. to Jibuti, embarking for Palestine, where he sought Brit. protection, and the It. Gov. announced that it had annexed A. (The full details of the Italo-Abyssinian War will be found under ITALO-ABYSSINIAN WAR, 1935-1936.) In this manner the last independent state of the African continent (apart from Egypt), excepting Liberia, lost its sovereign status, though, by the prowess of Brit. arms, it was destined to be restored 5 years later. A. was consolidated with Eritrea and It. Somaliland into the colony of It. E. Africa. The annexation was recognised by the W. European powers a year later; but the Brit. Gov. only recognised It. sovereignty over A. in 1938. The It. did not make substantial progress either in the development of the country or in its colonisation, though it was proposed to spend a large sum on rebuilding Addis Ababa and in opening up roads. Military roads were constructed, but the It. probably never achieved actual control much outside the garrisons and in air communications. For the conquest of A. by the Brit. forces in the Second World War, see ITALIAN EAST AFRICA, SECOND WORLD WAR CAMPAIGN IN (1941). See also ETHIOPIA.

See J. T. Holland and H. Hozier, *Record of the Exploration of Abyssinia* (2 vols.), 1870; A. B. Wylde, *Modern Abyssinia*, 1909; C. F. Rey, *Unconquered Abyssinia*, 1923; A. Hodson, *Seven Years in Southern Abyssinia*, 1927; Sir E. A. Wallis-Budge, *History of Ethiopia* (2 vols.), 1928; A. H. M. Jones and Elizabeth Monroe, *A History of Abyssinia*, 1935; C. F. Rey, *The Real Abyssinia*, 1935; R. E. Chocoman, *Lake Tana and the Blue Nile—an Abyssinian Quest*, 1936; A. J. Toynbee, *Survey of International Affairs*, vol. I, 1935; vol. II, 1936; Major Polson-

Newman, *The War in Abyssinia*, 1936; Macartney and Cremona, *Italy's Foreign and Colonial Policy, 1914-1937*, 1938; D. Mathew, *Ethiopia*, 1947; M. Ferham, *The Government of Ethiopia*, 1948; C. Sandford, *Ethiopia under Haile Selassie*, 1946.

**Acacia**, a genus of trees and shrubs, usually thorny, belonging to the sub-order Mimoseae of the order Leguminosae. The hardy tree commonly known as A. is false A. or robinia (*q.v.*). The true genus comprises over 400 species, found chiefly in the equatorial zone and the sub-tropical regions of Australia and Africa. The *A. Julibrissin*, however, is grown in the open air in some parts of France and the warmer European countries, and is remarkable for its clusters of beautiful pink flowers. The leaves of the genus are normally bipinnate, but are subject to modification, and the flowers grow in a head. The Australian 'wattles' are As. in which the leaf blade is absent, but the leaf-stalk has flattened into a phyllode with the edge presented to the light, and a thick epidermis which prevents transpiration. In America the fruits of the edible A. are used as food; in the Is. of Mauritius and Réunion the leaves of *A. Lebbek* serve as soap. *A. arabica* is used in tanning and gives gum arabic, while gum senegal comes from *A. Senegal*. The drug catechu is prepared from *A. Catechu*.

**Acacia**, False, see **ROBINIA**.

**Acacia**, Three-horned, see **HONEY-LOCUST TREE**.

**Acacius** (340-365), bishop of Caesarea, surnamed Monophthalmus (Gk., 'one-eyed'), founded an Arian sect known as the Acacians. His doctrine was that Christ is not of the same substance as God, but merely resembles Him.

**Acacius** (d. 489), patriarch of Constantinople from 471. He attempted to make Constantinople the chief of the E. churches, and was excommunicated by Pope Felix III.

**Academic Committee** (London), see **ROYAL SOCIETY OF LITERATURE**.

**Academic Legion**, an armed troop of Viennese students who joined in the revolt of 1818.

**Academus**, a mythical Attic hero who was supposed to have revealed to Castor and Pollux the hiding-place of their sister Helen. The *academia* in which Plato used to teach his pupils was named after him.

**Academy** (Gr. *Ἀκαδημία*), a garden in the Ceramicus, a W. suburb of Athens, so called after the hero Academus; a gymnastic school was held there; purchased by Cinon, son of Miltiades, who adorned it with statues and olive plantations and left it to the public; a favourite walk of Socrates and his disciples, but now famous because Plato, whose home was in the neighbourhood, taught there; his followers soon came to be called *Academick*, and *Academic philosophy* was synonymous with that of Plato. There was after Plato's death some variation in the philosophy, which

caused the following distinctions to be made: Platonio A. under Plato, 398-348 B.C.; the Ancient A. under Speusippus, Xenocrates (*q.v.*), and Polemo; the Middle A. under Arcesilaus (*q.v.*); and the New A. under Carneades (*q.v.*). Two more As. were founded after these: the Fourth A. by Philo of Larissa, and the Fifth A. by Antiochus of Ascalon, which terminated 79 B.C. Ptolemy Soter (*q.v.*) had endowed a museum essentially an A. at Alexandria, 314 B.C.; Charlemagne, at the suggestion of Alcuin, a school or institute resembling essentially an A. in 796 A.D. at St. Martin's, Tours. Until the time of the Revival of Learning most of the learning was to be found in the monasteries, some of which might be regarded as As. After the Revival of Learning most learned bodies were called As. The following is a list of As. arranged alphabetically, with the dates of their establishment: Ancona, Caliginosi, 1642. Berlin, Akademie der Wissenschaften, 1700, founded by Frederick I.; of Architecture, 1799. Bologna, Eccles., 1687; Mathematics, 1690; Sciences and Arts, 1712. Boston, Amer., A. of Arts and Sciences, 1780. Brescia, A., 1801; Erranti, 1626. Brest and Toulon, Military, 1682. Brussels, Académie Royale, 1773. Bucharest, Rumanian A., 1866. Cuen, Belles Lettres, 1705. Chicago, U.S.A., Sciences, 1865. Copenhagen, Sciences, 1712; Beaux Arts, 1751. Cortona, Antiquities, 1726. Dublin, Royal Irish A., 1792; Royal Hibernian A., 1803. Edinburgh, Royal Scottish A., 1826. Erfurt, Saxony, Sciences, 1754. Faenza, Philoponi, 1612. Florence, Fine Arts, founded by Brunetto Latini, 1270; Platonica, founded by Lor. de' Medici, 1474 (dissolved 1521); Della Crusca or Furfuratorium, 1582; Del Cimento, 1637; Georgioli, 1752 (agric.); Antiquities, 1807. Geneva, Medical, 1715. Genoa, Painting, etc., 1751; Sciences, 1752. Göttingen, Gesellschaft der Wissenschaften, 1752. Haarlem, Sciences, 1760. Helsinki, Societas Scientiarum. Istanbul, A., 1851. Leipzig, A., 1768. Leningrad, A. of the U.S.S.R., formerly known as the Imperial, 1728. Lisbon, Portuguese A., 1779. London, Royal Soc. 1662; Royal A. of Arts, 1768; Royal A. of Music, 1823; Br., 1902. Lyons, Sciences, 1700. Madrid, Royal Sp., 1713; Hist., 1730; Painting and the Arts, 1753. Mannheim, Sculpture, 1775. Mantua, Vigilanti (Sciences), 1704. Marseilles, Belles Lettres, 1726. Massachusetts, Arts and Sciences, 1780. Milan, A., 1838; Architecture, 1880; Sciences, 1719. Modena, Società Italiana delle Scienze. Munich, Arts and Sciences, 1759. Naples, Rossana, 1540; Secretorum Naturae, 1560; Sciences, 1695; Hercolaneum, 1755; Nuova Società Reale, 1808. Newhaven, U.S.A., Connecticut A. of Arts and Sciences, 1799. New York, Amer. Geographical Society, 1852; Literature and Philosophy, 1814; Sciences, 1876 (founded as Lyceum of Natural Hist., 1818); National A., 1863; Lyceum of Natural Hist., 1824. Nîmes, Royal A., 1682. Oslo, A., 1837. Padua, Poetry

1610; Sciences, 1792; A., 1779. *Palermo*, Medical, 1646; Fine Arts, 1300. *Paris*, Académie Royale de Peinture et Sculpture, 1648; Académie Royale d'Architecture, 1671; Académie Française, 1635; Académie des Inscriptions, 1663; Académie Royale des Sciences, by Colbert, 1666; Académie de Peinture, by Le Brun, 1648; all suppressed in 1793; in 1795 Institut National was founded. This was divided into 3 then 4 parts in 1803, and in 1816 the original names were restored to these 4 parts by Louis XVIII.: (a) Académie Française; (b) Académie des Inscriptions et Belles Lettres; (c) Académie des Sciences; (d) Académie des Beaux Arts; and in 1832 Académie des Sciences Morales et Politiques. *Parma*, Innominati, 1550. *Pennsylvania*, A. of Fine Arts, 1805. *Perugia*, Insensati, 1561; *Philadelphia*, U.S.A., Natural Sciences, 1812; Philosophical Society for Promotion of Useful Knowledge, 1743. *Rome*, Lincei, 1609; Umanisti, 1611; Fantastici, 1625; Infeccondi, 1653; Painting, 1656; Arcadi, 1656; Eng., 1752; Nuovi Lincei, 1847. *St. Louis*, Miss., A. of Science, 1857. *Stockholm*, Sciences, 1741; Belles Lettres, 1753; Agric., 1781. *Toulon*, Military, 1682. *Trondhjem*, A., 1760. *Turn*, A. of Sciences, 1757; Royal Institute, 1783; Fine Arts, 1778. *Upsala*, Royal Society, 1720. *Venice*, A., 1831; Medical, 1701. *Verona*, Music, 1543; Sciences, 1780. *Vienna*, Sculpture and Arts, 1705; Surgery, 1783; Oriental, 1810; Kaiserliche A., 1487. *Warsaw*, Language and Hist., 1753. *Washington*, D.C., National Geographical Society, 1888; International A. of Sciences, Arts, and Letters, 1910; Smithsonian Institution, 1846.

The word A. is also used to signify: a school or college; a drawing, usually in black and white chalk, from the living model.

**Academy, British** (London), for the furtherance of hist., philosophy, philology, archaeology, etc., Burlington House, Founded 1902.

**Academy (Royal) of Arts** (London). When George III. came to the throne of Great Britain in 1760 he commenced to encourage the cultivation of the arts. Attempts had previously been made by the prin. artists to form a permanent A. for the cultivation of painting, sculpture, and architecture, but they had failed. In 1760, however—with the assistance of 'The Society for the encouragement of Arts, Manufactures, and Commerce, in Great Britain,' which was estab. in 1754—the artists opened the first public exhibition which attracted public attention. In 1765 a charter was obtained from the king, and the society became 'The Incorporated Society of Artists.' This, however, was not entirely successful, and a memorial signed by 22 artists was presented to the king asking for his sanction and encouragement for a gratuitous national school of art. The king approved, and 'The Royal Academy of Arts in London, for the purpose of Cultivating and Improving the Arts of Painting, Sculpture and Architecture,'

was founded, Dec. 10, 1768. Sir Joshua Reynolds was appointed president; G. M. Moser, keeper; F. M. Newton, secretary; K. Penny, prof. of painting; T. Sandby, prof. of architecture; J. Wall, prof. of perspective; Dr. William Hunter, prof. of anatomy. Its first quarters were in Somerset House, but when old Somerset House was purchased by the nation a part of the new building was given to the society. It took possession of its new quarters in 1780, and the first exhibition was held in 1781. In 1836 it was removed to Trafalgar Square, and it was afterwards removed to Burlington House, Piccadilly, its present quarters. It consists of 40 academicians, painters, sculptors, engravers, and architects; 30 associates; and sev. honorary members. An exhibition of works by living artists is held every summer from the first Monday in May to the first Monday in Aug., and an exhibition of works by old masters every winter from the first Monday in Jan. for ten weeks. There are schools which give instruction in art, and all persons who have passed the required examination are admissible as students of the A. See Graves's *Royal Academy Dictionary*, 1769–1906; Hodgson and Eaton's *Royal Academy and Members*, 1768–1830 (1905); Laidlay's *Royal Academy* (1898); *Academy Notes*, Blackburn, 1878–1900. The corresponding Amer. A. is the National A. of Design, founded 1826; it admits 125 painters, 25 sculptors, and 25 architects and engravers.

**Academy of Arts and Letters (America)** is a select body of men distinguished in the realms of literature, painting, and music. It had its origin in the National Institute of Arts and Letters, and its object was the furtherance of all 3 of these arts. The first 7 members of the A. elected in 1904 were William Dean Howells, Augustus Saint-Gaudens, Edmund Clarence Stedman, John Le Farge, Samuel Langhorne Clemens (Mark Twain), John Hay, and Edward A. MacDowell. The head offices are in 633 West 155th Street, New York.

**Academy, The.** Once a well-known literary and artistic journal; defunct in 1915. Founded by C. E. C. B. Appleton, who otherwise remained inconspicuous in the world of letters. He had received his education at Oxford and the Ger. univ., and, having completed his studies, he saw an opening for a new journal of a high standard in England. The first number of the A. appeared on Oct. 9, 1869, and had as its subtitle the words *A monthly record of Literature, Learning, Science, and Art*; the publisher was John Murray, and its price was 6d. The aim of the founder was expressed in the quotation he chose from Horace, *Inter sylvas Academici querere verum* ('To seek for truth in the groves of Academus'). Appleton acted not only as editor of his journal, but also as its business manager, and for 10 years he maintained it at a high level of excellence. Among the many famous men who contributed to its early pages were Matthew

Arnold, Sidney Colvin, T. H. Huxley, John Lubbock (Lord Avebury); Mark Pattison, W. M. and D. G. Rossetti, R. C. Jebb, F. T. Palgrave, J. A. Symonds, Wm. Morris, Michael Foster, W. W. Skeat, and Max Müller. From its position as a monthly it changed to that of a fortnightly and finally a weekly periodical priced at 3d. It incorporated *Literature* in 1902.

Acadia or Acadie, see NOVA SCOTIA.

Acajutla, chief seaport of El Salvador, Central America, on the Pacific Ocean; pop. 1100.

Acalephæ (from Gk. ἀκάληφη, a sea-nettle, a name given by Aristotle to the jelly-fish tribe because of their stinging properties. Cuvier covered with the term the Acraspeda, Lucernarida, and Ctenophora, but the nomenclature has since been altered.

Acampichili (Aztec, 'handful of reeds') (d. probably in 1403), the first king of the Aztecs of Mexico. He constructed canals and built stone edifices, and generally improved the conditions of his kingdom.

Acanthaceæ (Gk. ἀκανθα, a thorn), an order of dicotyledonous, monopetalous plants, allied to the Labiata and Scrophulariaceæ. The plants are herbaceous or small shrubs, with a gamopetalous corolla in 5 divs., a convex receptacle, bifid ovary, leaves without stipules, brilliant flowers nearly always solitary in the axil of a leaf or a bract. Many of the plants have medicinal properties.

Acanthus (from Gk. ἀκανθα, a thorn), generic appellation which was applied by Cuvier to some porcupines (Rodentia). The typical species is *A. Javanicum*.

Acanthocephala (Gk. ἀκανθα, a thorn, κεφαλή, a head), a class of parasitic worms of which the *Echinorhynchus* is the chief genus. The largest species, *Gigantorhynchus*, is found in the pig, and may attain a length of more than a yard, but most species are less than 1 cm. in length. It has a cylindrical body with a proboscis furnished with many hooks by which it attaches itself to the intestine of its host. When the embryo is born it is ejected from the body of the host and depends for its further development on being swallowed by an intermediate host, which in the case of *E. gigas* of the pig is the larva of a particular beetle. It continues in these surroundings for a time, but only reaches adult proportions if the intermediate host is eaten by a pig, its permanent host, when the cycle begins again.

Acanthodes (from Gk. ἀκανθα, a thorn, ὀδούς, a tooth), genus of fossil Ganoid fishes established by Agassiz. They are found in carboniferous strata near Edinburgh.

Acanthophis (from Gk. ἀκανθα, a thorn, ὄφις, a serpent), a genus of venomous snakes of small size, which feed on mice and frogs, and have the tail ending in a horny little spike. The typical species is the *A. cerastes*.

Acanthopterygii (from Gk. ἄκανθα, a thorn, πτέρυξ, a wing), one of Cuvier's 3 primary divs. of fish, those in this

section having bony skeletons with prickly spinous processes in the dorsal fins.

Acanthurus (from Gk. ἀκανθα, a thorn, οὔρα, a tail), a genus of Acanthopterygii found in tropical seas. *A. chirurgicus*, vulgarly termed Doctors, is a well-known species, having on each side of the tail a sharp movable spine like a lancet.

Acanthus (Brankursine or Bear's breech), the term applied to a plant by the Gks. and Romans, and adopted by Linnæus, which gave the generic name to the Acanthaceæ.

Acanthus, in architecture, is the sculptured leaf which is the distinguishing characteristic of a Corinthian capital. The *A. mollis* growing on a tomb suggested this ornamentation to Callimachus in the fifth century B.C.



Roman ACANTHUS Greek

A capella (It., 'in church style'), a musical term used in reference to compositions in which the vocal parts have either no instrumental accompaniment or else one in which only octaves and unison are employed. In time it is equal to *alla breve*.

A capriccio (It., 'capriciously'), a musical term which indicates that the composition may be played in time and expression according to the will of the instrumentalist.

Acapulco, the most important seaport on the Pacific coast of Mexico, 180 m. from the cap. The harbour is deep and capable of containing 500 ships, but the climate is unhealthy and the tn. subject to frequent earthquakes. That of 1909 practically destroyed the tn. Exports chiefly consist of hides and fruit. Pop. 6000.

Acarides (from Gk. ἀκαρίς, small, εἶδος, form), or Acarina, are a low order of the Arachnida, vulgarly known as mites. The body is usually globular and presents no exact div. between the abdomen and cephalo-thorax. The organs are simple, and the mouth is adapted for biting or sucking. The *Sarcoptes scabiei* produces gall. *Tyroglyphus siro* is the cheese-mite. See also MITES.

Acarman, son of Alcmaeon and of Callirrhoe, daughter of the R. Achelous. Following tradition, he avenged his father's death by immolating the sons of Phereus. He became the eponymous hero of the Acarnanians.

Acarnania, a country of anct. Greece, bounded on the N. by the Ambracian Gulf, now the gulf of Arta, and Ætolia,

and on the W. and S.W. by the Ionian Sea. It was inhabited by a piratical race, which formed a league and had for its cap. Stratus, a tn. situated on the R. Achelous. It was subdued by the Macedonians in 225 B.C. In 146 it became part of the Rom. prov. of Achæa, and to-day it forms with Etolia a prov. of modern Greece.

**Acastus**, king of Iolcus, one of the Argonauts. On his return from Colchis he instituted funeral games in honour of Pellas, his father, whom his sisters had killed, in accordance with the advice of Medea, who had promised to revivify him as a young man. He was dethroned and killed by Peleus. See Ovid, *Metam.* vii. 297-349.

**Acatalectic** (the opposite of catalectic; Gk. *καταληκτικός*, to leave off), a term in prosody, meaning that the metre does not allow of the omission of an unaccented syllable at the end of the line. 'Catalectic' is applied to verse in which the normal metrical pattern lacks a syllable at the end of the line. The familiar trochaic metre of, e.g. Longfellow's *Psalm of Life*, is alternatively acatalectic and catalectic, thus:

Tell me not 'in mournful numbers  
Life is but an empty dream.'

**Acatepsy** (Gk. *ἀκατεψία*, without, *κατα-λειτουργία*, to seize), the name of the doctrine of Arcesilaus, the Gk. philosopher, who maintained, in opposition to the Stoics, that there can be no criterion of truth. The Sceptics apply the term to incomprehensibility.

**Acateango**, a volcano of Guatemala, Central America, 12,810 ft. high. Near it is a tn. of the same name with a pop. of 3000.

**Acatlan**, a tn. and div. of Mexico, in the prov. of Puebla, on the R. Acatlan, a trib. of the Río de las Balsas or Mexcala; pop. about 46,000.

**Acatus** (dimin. *acatium*), a small boat, swift and light, propelled by wind or oars, used by the ant. Gks., particularly by pirates. It bore a spike in the front and was curved at the prow.

**Accad**, or **Akkad**, the northern of the 2 provinces into which ancient Babylonia (q.v.) was at one time divided, the other being Sumir, the biblical Shinar. One of the 4 cities mentioned in Gen. x. a- having been founded by Nimrod with Babel, Erech, and Calneh in the 'land of Shinar.' The sacred texts of Assyria and Babylonia were written in the Accadian language.

**Acca Larentia**, or **Laurentia**, a Rom. deity, fabled to be wife of Faustulus, shepherd of Numitor, and foster-mother of Romulus and Remus. According to another legend, she was a courtesan who married a rich Etruscan named Tarrutius, and left her wealth at her death to the Rom. people.

**Accalia**, often called **Larentalia** or **Larentinalia**, funeral festival celebrated in Rome on Dec. 23 in honour of Acca Larentia (q.v.).

**Accelerando**, a musical term to indicate the quickened movement of a passage.

**Acceleration**, increase of velocity. According to Newton's first law of motion, a body persists in a state of rest or uniform motion in a straight line unless acted upon by some force. The force therefore tends either to increase the speed of a moving body or to retard it. The former effect is called positive A. and the latter negative A., or retardation. As long as the force acts the A. is produced. A good example is the action of gravity on a falling body. Starting from rest it gives the body a motion of 32 ft. per second at the end of the first second (the average velocity therefore being 16 ft. per second), 64 ft. per second at the end of the next, 96 the next, and so on. See MECHANICS.

**Accensi**, a Rom. name used with sev. meanings. It denoted citizens added to the fifth class of Servius Tullius, also reserve soldiers whose only weapons were sticks and stones (*A. velati*), and inferior officers attendant on magistrates and consuls.

**Accent**. In modern languages there is a tendency to distinguish one syllable in every word by a more impressive utterance; this is called A. In a long word there are frequently two As., but they need not be equally emphasised; as in the words *manufacture* and *independent* and in the phrase 'on the top of the hill' the first A. is comparatively faint. For ant. A., especially the Gk., see METRE. The A. of words is variable and has undergone some changes. Thus we say *triumph*, while Milton said *triumph*, the noun and the verb being distinguished by him as we distinguish nowadays *produce* the noun and *produce* the verb. Comparatively recently *advertisement* has become *advertisement*. The tendency, due to a desire for rapid speaking, is to throw the A. back. The symbols used in Gk. to denote A. are three: the acute (´), the grave (`), and the circumflex (˘). So far we have only spoken of the first: the second denotes the opposite to the acute, or perhaps the absence of it; the circumflex marks a compound of the two first, a rising then a falling of the voice in the articulation of the syllable. These symbols are used in the Fr. language with quite a different meaning. The Fr. language, like all other languages, has been found deficient in the number of characters used to mark vowel sounds, and the three symbols above are used for this purpose. Thus the sounds of *e*, *é*, *e*, *è* in point of A. differ not so much as in point of articulation.

**Accent** (in mathematics): (1) A mark placed at the right hand of a letter and a little above it to signify different magnitudes of the same kind by means of the same letter with different As., e.g. *a*, *a'*, *a''*, *x*, *x'*. (2) In trigonometry to express the minutes and seconds of a degree, e.g.  $8^{\circ} 10'' = 8$  minutes 10 seconds. (3) To express feet and inches, e.g.  $2^{\circ} 6' = 2$  ft. 6 in.

**Accent** (in music) is the regular emphasis occurring in a series of notes. It is usually placed on the first beat after the bar-line, and in any music divided

into bars of more than 3 beats there is usually a secondary A. less strongly stressed.

**Accentor** (Lat. *ad*, to; *cantor*, singer), a sub-family of small birds, probably related to the thrushes. Usually found in thickets in hilly dists. Represented in Great Britain by the hedge-sparrow.

**Acceptance, Acceptor**, see **BILL OF EXCHANGE**. For acceptance in the law of sale of goods see **SALE**.

**Acceptilation** in Rom. and Scots law meant the remission of a debt by a creditor giving a receipt for money never actually paid. The word was used in theological controversy by the Armenians for the doctrine that the sufferings of Christ were not sufficient atonement for man's sins, albeit graciously accepted by God.

**Accession, Deed of**. In Scots law, the creditors of a bankrupt or other insolvent person can by a deed approve of, and bind themselves to concur in, the administration of his estate in trust for the general good.

**Accession of Property**. In the law of England and Scotland, derived from the Romans, property added to either naturally or artificially is said to be acquired by A. All accretions to property naturally added belong to the owner of the nuclear property; thus the offspring of animals, the produce of the soil, the increase of land due to alluvial deposits belong to the owner whose land has been added to or whose fields or cattle have been fruitful. Property acquired artificially, as, for example, when a man builds a house on another's land or embellishes or works on another's material, was generally under the Rom. law held to be the property of the owner of the prin. thing, provided compensation was made for improvement. An exception was made in cases where as the result of labour (which, of course, is a form of property) a totally new thing was produced. Thus the man who made wine from another's grapes or painted a picture on another's canvas retained the picture and the wine and compensated the owners of the canvas and the grapes, thereby reversing the usual rule. In the U.S.A. all A. or accretion is, in the absence of any agreement to the contrary, the property of the owner of the prin. materials.

**Accessory**. In Eng. law, an A. is one who, though not the prin. in a felony and even absent at the time of commission, has nevertheless been concerned with the crime, either *before* or *after* the fact. An A. *before* the fact has been defined by a dictum of Lord Hale as one who, 'being absent at the time of the crime committed, doth yet procure, counsel, or command another to commit a felony.' An A. *after* the fact is one who, knowing that a felony has been committed, assists, relieves, or protects the felon. The mere knowledge that a felony is about to be committed or the omission to apprehend or report the felon does not constitute accession, and a distinction must be made between As.

and prins. in the second degree who are present aiding and abetting. There are no As. in a case of misdemeanour or of treason; all persons concerned are held as prins. and generally receive the same punishment. In Scots law, except for treason, accession after the crime is not recognised, and in the United States the distinction of the Eng. common law between prin. and accessor has by statute been abolished, every person concerned being liable to punishment as a principal.

**Accho**, see **ACRE**, **ST. JEAN D'**.

**Acciacatura** (from It. *acciacare*, to crush), in music, a short *appoggiatura* or grace-note played almost at the same time as the prin. and accented note.

**Acciajuoli, Donato** (1425-78), Italian scholar, b. in Florence, who wrote lives of Hannibal, Scipio, and Charlemagne, and commentaries on Aristotle's *Ethics* and *Politics*.

**Accidence**, a corruption of accidents, signifying the properties and qualities of the parts of speech, as gender, number, and case; originally a small book containing these, but now used to express that part of grammar which deals with inflections (*q.v.*).

**Accident**, in logic, a property or quality of a thing which is not essential or inherent to it, as whiteness in paper. The word is applied to all qualities in distinction from substances (*q.v.*).

**Accident**, means any extraordinary or unforeseen event. In the law of torts 'inevitable accident' is the antithesis of negligence, and, generally speaking, involves no liability in damages. The word, however, varies in its legal connotation according to the context: thus, in the criminal law, it means an act done unintentionally and in such circumstances that no person of common prudence could very well have avoided it.

In insurance practice, however, the word A. includes occurrences brought about by the negligence of the insured or assured and of other or third parties. See **INSURANCE**, *Casualty and Contingency Insurance*. In the law of Workmen's Compensation the word is also loosely used to include not only events accidental in a popular sense but, for the purposes of statutory compensation, others which are in no sense fortuitous. See also **ACCIDENTS**, **MOTORING**; **WORKMEN'S COMPENSATION**.

**Accidental Colour** is the name given to an imaginary complementary colour seen when the attention is fixed on a white surface after it has been concentrated on a bright colour. The complementary colour to yellow is blue, and red to green.

**Accidentals**, in music, are signs occurring before a particular note, not in the signature, which change the pitch during the course of a bar. These signs are the flat, double-flat, sharp, double-sharp, and the natural.

**Accidents, Motoring**. In the case of an accident causing damage to any person, vehicle, or animal, the driver of the motor vehicle must stop, and on request

of any person having reasonable grounds for so requiring, give his name and address and identification of his vehicle. If this is not done on the spot, then the accident must be reported at a police station or to a constable as soon as possible, and in any case within 24 hours. Hospitals now have a right to claim the reasonable expenses of hospital treatment from the insurance company which is meeting claims under a Third Party insurance policy (Road Traffic Act, 1930 sec. 36). Doctor's fee (12s. 6d.)—plus 6d. per m. (over 2 m.)—is now recoverable for treatment to an injured motorist (Road Traffic Act, 1934, sec. 16).

**Accipitres** (Lat. *accipiter*, hawk), Raptures, or Rapaces, the common name for all birds of prey. They appear by day and by night, and are recognisable by their crooked and powerful beaks and talons.

**Accius** or **Attius**, a Rom. tragic poet, was b. 170 B.C. and lived to a great age. Some of his works were on Rom. subjects (*præciata*), but the majority were imitations from the Gk. Only fragments of his works survive.

**Acclimatisation** is the adaptation of plants, animals, and mankind to the difference in climate experienced in some place other than the native country. It differs from *domestication*, which implies protection, and from *naturalisation*, which implies mere residence in another country, by the fact that it requires adaptation. It is made difficult of study in that many other factors are present which would bring about or prevent any change in the original nature of the plant or animal under observation, e.g. changed conditions in food, increase of enemies, and in man intermixture of races. One of the common products of A. in all kinds of organic life seems to be fertility, which can be seen in many cases; in others, however, the reproductive element is limited, as in some plants which lose all power of sexual reproduction when transferred to varying climates, and propagate only vegetatively. The fertility of adapted animals has sometimes proved a great disadvantage to the adopted country, the introduction of rabbits into Australia and their subsequent degeneration into a pest being a case in point.

It has been maintained by some scientists that man is incapable of adaptation, but there are many evidences to the contrary. The universality of the Jewish race is well known, and though they originally dwelt in a warm country, they now swarm over Europe in its temperate and cold climates, their numbers in Russia being enormous. As they largely marry among themselves and keep the purity of their race, it is evident that A. has been successfully accomplished in this instance. Again, the Dutch colonists who have settled in various parts of the globe where the climate is tropical, and who have not mixed with other races, are a strong and healthy people. The contention that Europeans who have

emigrated to India and S. America deteriorate in health and have delicate offspring does not disprove the A. theory; the delicacy is due to the self-indulgence and indolence of the European races, who will not observe the abstemious habits necessary to the changed conditions of life. It is almost essential that the change of climate should be gradual, for where it is violent the human body has not grown accustomed to its new sphere, and diseases which are comparatively harmless to natives of a country frequently prove fatal to strangers, e.g. malaria and liver complaints affect Europeans in the tropics, while lung troubles are common in Africans transferred to colder climates. Those races which inhabit the temperate regions, such as the Eng., Fr., and Ger., are best able to adapt themselves to new climatic conditions.

In France a society was founded in 1854 by Isidore Geoffrey Saint-Hilaire for the practical and theoretical study of this subject, and the Société Nationale d'Acclimation has adapted species and receives assistance from the Jardin Zoologique d'Acclimation. London has the Zoological Gardens and Kew Gardens, in which A. can be seen in animals and plants, respectively. See I. G. Saint-Hilaire's *Acclimation et domestication des animaux utiles*, 1861; Chas. Darwin's *The Variation of Animals and Plants under Domestication*, 1868; J. Hann's *Handbuch der Klimatologie*, 1897; B. E. Livingston: *Climatic Areas of the U.S. related to Plant Growth*, 1913.

**Acce**, or **Aecho**, in anct. geography a tn. of Phoenicia, later called Ptolemais, now Saint Jean d'Acre (see *ACRE*).

**Accolade** (Fr., from It. *accollare*, to embrace, from Lat. *ad*, to, and *collum*, neck); 1. An anct. ceremony, used in conferring knighthood. It was supposed that it consisted of an embrace, but is now believed to have been a slight blow on the cheek or shoulder. 2. In music, a brace used to join sev. parts.

**Accolti**, **Benedetto** or **Benedict** (1415-1466), an It. jurist and writer, b. at Arezzo. He became chancellor of the republic at Florence in 1459, and held this office until his death. His poem of Godfrey of Bouillon's conquest of Palestine, the *De Bello a Christianis contra Barbaros gesto pro Christi Sepulchro*, 1432, was the basis of Tasso's *Gerusalemme liberata*, 1576.

**Accolti**, **Bernardo** (c. 1465-c. 1535), It. poet, son of the jurist Benedetto Accolti, was b. at Arezzo and was known as *l'Unico Areentino*. He owed his fame to his powers of poetical improvisation, and when he announced that he would recite his poems, tradesmen closed their shops and flocked to hear them; unfortunately they have hardly survived him.

**Accolti**, **Pietro** (1455-1549), It. cardinal, brother of Bernardo Accolti, was b. and d. at Florence. As cardinal of Ancona he had a large share in drawing up the bull against Luther in 1520.



**Accommodation**, a term used for a method in Scripture by which the truth is modified in order to bring the divine revelation within the reach of human understanding. In the N.T. this is done by means of parables, and in the O.T. the application is frequent.

**Accommodation Bill**, a bill of exchange to which a party has put his name without consideration (*q.v.*), and for the accommodation of another; the latter should find the funds for payment when the bill becomes due, but the holder for value (*see* BILL OF EXCHANGE) is entitled to sue the accommodating party, though he knows of the want of consideration. The fact that an acceptor is an 'accommodation party,' though no defence to an action by another party, entitles the acceptor to what he would not usually have, a recourse to the drawer he accommodated. The defence of an 'accommodation bill' or 'accommodation party,' therefore, is very rarely one which gets beyond the solicitor or counsel when they are first consulted, because it is seldom any use to bring such a defence into court.

**Accompaniment**, in music, is the assistance given to a solo part by subordinate parts either vocal or instrumental. Thus a song or a violin solo may have a pianoforte A. in order to bring out and emphasise the beauty of the primary music. A. is also the harmony of a figured bass.

**Accomplice**, a person associated with another in committing or attempting to commit a crime. An A. may give evidence in court, *i.e.* turn king's evidence, but, although there is no exact rule to this effect, the general practice is to discount its value unless supported by independent testimony.

**Accoramboni, Vittoria** (d. 1585), duchess of Bracciano, a woman celebrated for her beauty and tragic history. Married to Francesco Peretti, nephew of Pope Sixtus V., she instigated his murder, then married his murderer, the duke of Bracciano. On his death she was involved in a lawsuit with Luigi Orsini regarding the inheritance, and murdered by him at Padua. Her story has been written in novel form by Tieck in 1840, and she figures as the heroine of Webster's *White Devil*, 1612.

**Accord and Satisfaction** may be pleaded by a defendant in a civil action in an Eng. court, viz. that he has agreed with the plaintiff, and has acted upon the agreement, to pay money or perform some action in satisfaction of the plaintiff's demand.

**Accordion**, a musical instrument invented by Damian of Vienna, 1829. It is in the form of a small oblong box, consisting of a row of very small elastic metallic springs, fixed at one end in a plate of metal, so that they may vibrate freely, and a bellows to put the springs into vibration. The instruments vary in size and in capabilities, and 2 or more notes can be played at once.

**Accorso, Francesco** (Latinised *Accursius*) (c. 1180-c. 1260), It. jurist, b. at Florence. He wrote glosses on

Rom. law, and his chief work, the *Great Gloss*, was long a standard authority.

**Accorso, Mariangelo** (c. 1490-c. 1550), It. writer and critic, b. at Aquila. He pub. in 1521 the *Diatribe in Ausonium, Solinum et Ovidium*.

**Accosted**, *see under* HERALDRY.

**Accoucheur**, *see under* OBSTETRICS.

**Account**, general term for a statement of pecuniary transactions between two parties. According to Eng. law, an *A. stated* is one in which both debtor and creditor have agreed to the balance. The debtor is, however, not precluded from showing, if he can, the existence of error, but if the A. has been actually settled by payment it can only be reopened upon proof of fraud. A *settled A.* is a written statement, agreed to by both parties as correct, of the final position of 2 As.

All modern commerce is conducted by keeping records of As. (*see* BOOK-KEEPING), and public bodies and companies, such as town councils, limited liability companies, friendly societies, also executors and trustees, or administrators of estates and similar officers of the court, are all bound by statute to keep As., and provision is made for audit and inspection. It is also a criminal offence under the bankruptcy laws for the bankrupt to have failed to keep such books as the usage or importance of his business would seem to warrant.

**Account, or Accompt, Writ of**, a form of legal action now rarely resorted to, but which was much used in early times, for the recovery of money wrongfully retained.

**Account, Account Current, Account Sales**, *see* BOOK-KEEPING.

**Accountant**, a person skilled in the practice of keeping books of accounts and generally with a knowledge of bankruptcy and mercantile law. The name is applied to officials, such as employed by banks, insurance companies, railways, and other large businesses, whose duty it is to supervise the keeping of accounts and to prepare balance sheets, etc. An *A. of Court* is an officer of the Scottish court of session, whose duties are defined by the Judicial Factors (Scotland) Act, 1889, part of which include bankruptcy affairs. The profession of accountancy is generally more of a consultative nature, and an A. one who is called in from outside to audit and investigate books, to give advice as to how they should be kept, and to make reports as to solvency. Their status has been regularised and their standard of efficiency maintained by societies of As., some incorporated under royal charter, and a member of one of these societies is called a *Chartered A.* The Institute of Chartered As. of England and Wales was founded in 1880. In the U.S.A. is an Association of Public As.

**Accountant-General**, title of 2 officials in the chancery court and exchequer court whose offices were abolished in 1872, and whose duties were transferred to the paymaster-general. The former was appointed in 1726 to

manage the moneys of the suitors in the court, and more particularly in connection with the depositing of them in the Bank of England.

**Accous**, a tn. of France near Oloron in the Basses-Pyrénées, containing medicinal springs; pop. 900.

**Accra**, a seaport in, and cap. of, the Brit. W. African colony of the Gold Coast. It has sev. churches, a bank, club-house, European shops, many schools and hospitals; 5 m. N. is Achimota College, the chief educational establishment on the Gold Coast. Cocoa is the chief export, and the prosperity of A. is largely dependent on the crop and its world price (as was proved by the inquiries of the cocoa commission in 1938, which was sent out by the Brit. Gov. owing to the refusal of the cocoa farmers to sell cocoa at all at the price—about £18 a ton, as against threefold that price in previous years). Other exports are gold, ivory, and palm oil. It is the terminus of a railway to Kumasi. A. is lighted by electricity and has pipe-borne water supplies. There are wireless posts there for inland communication. Considerable damage was done by an earthquake which occurred not long before the Second World War. Pop. about 75,000.

**Accrington**, a manufacturing tn. and municipal bor. in Lancashire, about 22 or 23 m. N. of Manchester. It is noted for its cotton manuf., calico-printing, machinery, and weaving, and possesses a town hall and market hall. Coal and iron are worked in the neighbourhood; pop. 44,000.

**Accum**, Friedrich (1769–1838), Ger. chemist, b. at Bückeburg in Sch-Lippe, crossed to England in 1793, and became prof. of chem. in London in 1802. He introduced illumination by gas into England by his *Practical Treatise of Gaslight*, 1815. He was appointed prof. in Berlin in 1822, and d. in that city. His other chief works are: *An Essay on Chemical Reagents*, 1816, and *A Treatise on the Adulteration of Food*, 1820.

**Accumulation**, see CAPITAL.

**Accumulation**, a legal term implying the A. of income from an estate that has been bequeathed by will or deed, during which time the legatee might not enjoy the estate. The *Thellusson's Act*, 1800 (40 Geo. III. c. 98), which imposed certain restrictions on A., provided that it could only continue during the life of the settler plus 21 years, or during the period of legal minority of the legatee. Where A. has been directed contrary to the provisions of this Act, the direction as to A. is null and void, but not the settlement, and the property passes to such person or persons as would have been entitled to it had A. not been directed. Certain exceptions, such as the provision for payment of debts and for raising portions for children, etc., are made in Section 2 of the Act. The Act at first applied only to England, but it was extended to Scotland in 1848 (12 Vict. c. 36).

**Accumulation of Power**, see *Hydraulic Accumulator*, *infra*.

**Accumulator**, a term applied to any device for storing energy so that machinery may be worked when the actual engine supplying the motive power is at a standstill. The most common applications of the term are in hydraulics and electricity.

**Hydraulic A.**—Lord Armstrong's A. consists of a large cylinder in which a piston works through hemp or leather packing. The piston is driven up by the pressure of water forced in at the bottom of the cylinder by successive strokes from a small engine. When the top of the cylinder is reached a catch operates which automatically stops the engine. The piston is usually weighted so as to provide a pressure of about 700 lb. to the sq. in. The energy accumulated may be used to work cranes, dock gates, or any machinery where intermittent power only is required. There are varieties of the machine where pistons of different diameters are employed to give differences to pressure, and others where steam pressure is accumulated.

**Electric As.**—The term is applied to contrivances which are more appropriately known as secondary or reversible batteries. The principle upon which they are constructed is derived from the working of a voltmeter, an instrument in which water is decomposed by the electric current. It consists of a glass vessel fitted with two platinum plates connected with wires passing through the glass. When the platinum plates are covered with acidulated water and the wires connected up with a battery, an electric circuit is estab. of which the water forms a part. This causes the phenomenon known as *electrolysis* (*q.v.*), the effect of which is that minute bubbles of oxygen collect at the positive plate or electrode and hydrogen at the negative electrode. These gases are collected in receptacles adjusted to receive them. If, whilst the bubbles still adhere to the plates, the outer current is cut off and the two electrodes connected through a galvanometer, it is found that a reverse current is indicated, the gases recombining through the liquid. It is evident that if the products of electrolysis could be kept in contact with their respective plates, it would be possible to recover during their recombination a large proportion of the electrical energy which caused the decomposition. For such a purpose the electrolysis of water is obviously unsuitable, as the hydrogen and oxygen quickly escape.

**Planté's Cell.**—Gaston Planté (1834–1889) devised a cell in which the products of electrolysis remained in connection with the plates. He used lead instead of platinum, so that the oxygen might combine with the positive electrode to form lead dioxide ( $PbO_2$ ). Two lead plates, about one-twentieth of an inch thick, are placed upon each other, but insulated by means of india-rubber strips. They are then rolled into a cylindrical form and placed in a vessel containing water diluted with sulphuric acid. A cell is thus provided having lead electrodes

of considerable surface. Before the cell is ready for use as an A. it has to undergo a somewhat lengthy preparatory process known as 'forming.' On a current being passed through, the water is decomposed, the oxygen separating out at the positive plate and the hydrogen at the negative. The positive plate becomes oxidised and is covered with a thin coating of lead dioxide. When the current is cut off and the plates connected, a secondary current is set up in the reverse direction and the dioxide is reduced to lead, whilst the other plate becomes oxidised. This process of charging and discharging is repeated many times until one plate has a spongy deposit of lead dioxide and the other is covered with lead, also in a spongy condition, owing to its having been reduced from lead dioxide. It is necessary that both substances should be in this porous state in order that the acid may reach as large a surface as possible. It is obvious that the successive chargings and dischargings will take longer and longer as more of the lead becomes oxidised. Planté recommended an ever-increasing period of repose between the steps of the process, so that some months elapse before the cell is ready for use.

An improvement in the preparation of the secondary cell was instituted by Camille Faure, who coated both plates before rolling them up with a paste made of red oxide of lead, which contains a smaller proportion of oxygen. The current has now only to complete the formation of dioxide on the one plate and to reduce the oxide on the other. Thus a good amount of the active material is produced with a great saving of time.

**Modern types.**—Storage batteries composed of Planté or Faure cells have many disadvantages: they are cumbersome and heavy, the spongy material has a tendency to drop off the conducting backing, and they buckle easily and so cause internal short-circuiting. Many improvements have been devised to obviate these difficulties. The positive and negative plates are now made flat, and are arranged alternately in the box facing one another. The positive plates are all joined together to form one large positive electrode, and all the negatives are joined in the same way. Usually the outside plates are both negatives and can be distinguished by their grey colour, whilst the positive plates are brown. Each plate consists of a framework of a solid alloy of lead and antimony, with grooves or perforations in which the spongy active material is held. There is a space between the floor of the cell and the plates, so that any active material which becomes loosened drops clear and so does not produce short-circuiting. In some types of A. chonite separators are used between the positive and negative plates to prevent any contact. Such separators are perforated to allow of the free circulation of acid between plate and plate. The majority of modern

secondary batteries utilise the same chemical reaction as in Planté's cell, but in the Edison A. nickel plates are used in a solution of caustic potash. The advantage gained is the saving in weight.

A normal A. working under ideal conditions has an efficiency of 90-98 per cent, i.e. 90-98 per cent of the energy used in charging the A. is recovered in the form of a secondary current. In ordinary use the efficiency of an A. varies from 60-90 per cent, depending on the usage of the cell and the length of its service. The smallness of the space between the plates has the effect of reducing the internal resistance. They therefore compare favourably with other forms of storing energy. When bent steel springs are used to store energy, it is found that one kilogramme of steel is capable of storing about 4000 megergs (units of energy). One kilogramme of air compressed to one-sixth contains 2,250,000 megergs, of which about 450,000 can be recovered in the form of work. Secondary batteries are capable of storing about 500,000 megergs per kilogramme, of which about 450,000 units can be recovered.

As. can be used for any purposes for which primary batteries are usually employed. The disadvantage of the latter is the comparatively high cost for materials when much power is required, whereas As. are charged by the more economical D.C. generator (or A.C. generator with rectifier), and their maintenance, under favourable conditions, is not an expensive matter. Where current cannot be taken directly from the mains, therefore, As. may be used with advantage.

There are a few applications of As. where their use has contributed greatly to the economy and efficiency of electrical service dependent upon generators. A generator driven by a gas engine is affected by the alternately quick and slow stroke, with the result that the light flickers. An A. connected with such a generator has an equalising effect, because it takes up current during the quick stroke and gives it up during the slow stroke. In systems where electrical power is distributed from a central station, the demand for current varies naturally from time to time. The As. then serve to equalise the load; they absorb power when demand is small, and assist the generator during the busy hours. When the load is lightest they may be used to supply the whole demand made upon the station. The cells used for this purpose contain numerous plates and are massive in construction to meet the heavy discharges which may be called for; this naturally entails comparatively great size and weight, and consequently considerable expense in erection and maintenance. They are liable to rapid deterioration in process of time, especially if they are not intelligently looked after and periodically tested.

The traction type of A. has been greatly improved, and is used extensively for the transporting of light loads on

small trucks. The cases of the As. in this instance are made of a fibre compound and sealed with bitumen: the plates are also packed very tightly, and they are supported at the bottom by ridged ebonite strips placed edgewise. The electrical equipment now consists of 6 or 7 lamps, self-starter, windscreen wiper and many other devices, all of which depend on the A. for their supply of current; thus the A. has to be one which will stand rough usage in the running of the car coupled with occasional heavy discharge and little attention. Most of these difficulties have been overcome, and the car A. runs for many months without other attention than that of keeping the level of the electrolyte right in the cell. The modern A. has developed with the increased use of electricity, both for power-house and wireless work. Wireless calls for a small, cheap, and reliable A. Many modern wireless As. are sent out from the works in a state of dry charge, so that when the A. is filled with acid for the first time it is already charged and ready for use. There is also on the market a type of A. in which the electrolyte is in the form of a jelly.

**Accursius**, see ACCORSO, FRANCESCO.

**Accusative Case**, see under DECLENSION.

**Aeldama** (R.V. *Aeldama*), the Aramaic for field of blood, was the name used for the field bought by Judas (Acts i. 18), or by the chief priests, 'to bury strangers in' (Matt. xxvii. 6). It is also called 'the potter's field' (Matt. xxvii. 7, 10). By tradition this field is situated S. of the lower part of the Vale of Hinnom.

**Acephali** (Gk. ἀκεφαλος, headless), a name given to sev. religious bodies who rebelled against their bishops and other heads of the church. It was particularly applied to the Egyptian Monophysites, who declared themselves free from the authority of Peter Mongus, patriarch of Alexandria, in 482.

**Acephalus**, a hexameter line beginning with a short syllable.

**Aceraceæ**, or **Acerinææ**, a small order of plants which has for its distinguishing characteristics regular, polygamous or dioecious flowers; 5 to 12 stamens; 2 ovules in each carpel. The fruit is double, and has 2 winged samaras; the seed is exalbuminous. Plants of this order are arborescent or shrubby, nearly all contain saccharine substance, and are found in the N. of Asia, Europe and America.

**Acerbi, Giuseppe** (1773 - 1846), It. traveller and naturalist, b. near Mantua. He journeyed through Lapland to Cape North in 1799, and pub. an account of his travels in Eng. in 1802 under the title *Travels through Sweden, Finland, and Lapland*. He founded a journal, the *Bibliotheca Italiana*, at Milan in 1816. Later, as consul-general of Austria to Egypt, he collected many antique objects which he gave to It. and Austrian museums.

**Acerenza**, the anct. *Acherontia*, an It. city on the R. Bradano in the prov. of Potenza. It contains a cathedral built in the Norman style. Pop. 4780.

**Acerinææ**, see ACERACEÆ.

**Acerria** (*Acorrie*), an anct. tn. near Naples, in Campania, Italy, has a cathedral which was rebuilt after the earthquake, 1783, and sulphur springs. It was an old Rom. tn. was burnt by Hannibal, rebuilt and besieged by the Italians during the Social war. Pop. 16,700.

**Acestes**, a mythical king of Sicily, son of a Trojan woman, Egesta or Segesta, who was sent by her father to Sicily that she might not be devoured by the monsters which infested the ter. of Troy. The river-god Crimisus begot by her a son Acestes, who was afterwards regarded as the hero who had founded the tn. of Segesta, and who hospitably received Æneas on his arrival in Sicily.

**Acetabulum** (Lat., chalice), a cup-shaped socket of the innominate bone into which the head of the femur fits.

**Acetaldehyde**, see ALDEHYDE.

**Acetamide** (CH<sub>3</sub>·CO·NH<sub>2</sub>), a solid, crystalline compound produced by distilling ammonium acetate in a stream of dry ammonia. As usually prepared, it has a strong odour suggestive of mice, but this is due to impurities. It is soluble in water and alcohol, melts at 82°, and boils at 222° C.

**Acetate Silk**, see under ARTIFICIAL SILK.

**Acetic Acid** (CH<sub>3</sub>·CO<sub>2</sub>·OH), the earliest known acid, formed when wines and beer turn sour through exposure to the air. The change is brought about by the agency of bacteria (*Mycoderma aceti*). The bacteria find their way into the liquid from the atmosphere, are nourished by the food contained in the wine, rapidly multiply, and by means of an enzyme they contain cause the oxygen of the atmosphere to react with the alcohol, forming A. A. The sour liquid, or impure acid, is known as vinegar, and is usually prepared from wine that is otherwise unmarketable.

In the Ger. process, the wine is allowed to percolate slowly through beech shavings smeared with a culture of *Mycoderma aceti*, meeting a current of air on its downward path. This is known as the 'quick vinegar' process, and requires only three days or so to go to completion.

Commercial A. A. is obtained by the dry distillation of wood in iron retorts at as low a temp. as possible. The products of the distillation are gases, an aqueous liquid, and tar. The liquid contains A. A. mixed with methyl alcohol, acetone, and other impurities. It is treated with quicklime, which causes the A. A. to be converted into calcium acetate. This solution is then evaporated, the tarry products being skimmed off. The acetate is then distilled with concentrated hydrochloric acid and the A. A. is separated. It is mixed with potassium permanganate to oxidise impurities and distilled once more, after which the product is sufficiently pure for commercial purposes. A. A. is also manufactured by passing a mixture of oxygen and acetaldehyde vapour over heated manganese dioxide or granular quartz.

When quite pure, A. A. is a colourless

crystalline solid, with a pungent smell, a blistering action on the skin, and a sour taste. A 50 per cent solution of the acid has the same sp. gr. as the anhydrous acid, and addition of water to a certain point causes the sp. gr. to rise, although the acid is denser than water. This circumstance renders it impossible to determine the strength of the substance by the use of the hydrometer.

The salts of A. A. are known as acetates, and some of them are of considerable commercial importance. Basic copper acetate, or *verdigris*, manufactured by leaving sheet copper in contact with vinegar, is used as a pigment. Lead acetate, commonly known as sugar of lead, is used in the manuf. of the basic carbonate of lead (white lead). Ferric acetate and aluminium acetate are both used as mordants to fix the colours in dyeing and printing calico.

Acetic Ether, or Ethyl Acetate ( $\text{CH}_3\text{CO}\cdot\text{OC}_2\text{H}_5$ ), a colourless liquid prepared by adding a mixture of alcohol and acetic acid to a mixture of alcohol and strong sulphuric acid, the whole being heated to  $140^\circ\text{C}$ . Ethyl acetate is characterised by a pleasant fruity odour, which has led to its being used for flavouring sweets, wines, perfumes, etc. It is also a useful solvent.

Acetone ( $\text{CH}_3\text{CO}\cdot\text{CH}_3$ ), or Dimethyl Ketone, a colourless mobile liquid produced when isopropyl alcohol loses two atoms of hydrogen by oxidation. It is the simplest member of the fatty ketones.

A. occurs in small quantities in normal urine, but in far greater proportion in cases of *diabetes mellitus* and *acetonuria*. It is produced during the dry distillation of wood and other organic bodies, such as sugar and gum. Crude wood spirit consists mainly of acetic acid, methyl alcohol, and A. After the acetic acid has been removed by the action of lime, the methyl alcohol and A. are separated by fractional distillation. A. is also prepared by the dry distillation of calcium acetate, but the modern method of manufacture consists in passing the vapour of acetic acid over heated catalysts, e.g. alumina, thoria, or finely divided copper.

A. is miscible with water, alcohol, and ether in all proportions, and is an excellent solvent for many organic compounds, which renders it useful in the manuf. of cordite. It is also used in the preparation of sulphonal, trional, tetronal (drugs), chloroform, iodoform, and artificial silk.

Acetophenone ( $\text{C}_6\text{H}_5\text{CO}\cdot\text{CH}_3$ ), Phenyl Methyl Ketone, or Acetylbenzene, a crystalline substance melting at  $20^\circ$  and boiling at  $202^\circ\text{C}$ . It is a typical member of the aromatic-aliphatic ketone class of compounds. It is most conveniently prepared by treating benzene with acetyl chloride in the presence of aluminium chloride. It is employed as a soporific under the name of hypnone.

Acetyl, the organic group which would result by the elimination of hydroxyl from acetic acid; it therefore corresponds to the formula  $\text{CH}_3\text{CO}$ . It is unknown

in the free state, but is looked upon as the radicle of such compounds as A. chloride  $\text{CH}_3\text{CO}\cdot\text{Cl}$ .

Acetylbenzene, see ACETOPHENONE.

Acetylene ( $\text{C}_2\text{H}_2$ ), a colourless gas of disagreeable odour (when impure), formerly used as an illuminant, but now important as an 'intermediate,' i.e. a compound manufactured as a stage in the manuf. of other compounds. It is also used in the oxyacetylene blowpipe for welding, etc. It can be synthesised from its elements by an electric-arc discharge between carbon poles in an atmosphere of hydrogen, but this synthesis, though very interesting chemically, is of no commercial importance. A. occurs in small quantities in coal-gas, and is produced during the incomplete combustion of many organic substances, such as coal-gas, methane, ethyl alcohol, etc. The most important method of preparation is by the action of water on calcium carbide ( $\text{CaC}_2$ ).

Calcium carbide is prepared by heating carbon with quicklime in an electric furnace. Under the influence of the high temp., the quicklime is converted into calcium, which combines with the excess of carbon, forming calcium carbide, a white solid when pure. It is difficult to eliminate all the impurities from the substance, and the dangers attending the use of A. were formerly due to the presence of impurities as well as to ignorance of the properties of the gas itself.

The method of preparation of A. from calcium carbide consists simply of bringing it into contact with water. The reaction is somewhat violent and accompanied with the evolution of a considerable quantity of heat. Many types of generators have been invented in which the two substances are brought gradually into contact, either by allowing water to drip slowly upon the carbide, or by throwing small quantities of carbide into the water.

A. burns with a brilliantly luminous flame equivalent to about 240 candles for 5 cub. ft. of gas consumed. The quality of the light approximates to that of sunlight and renders its use advantageous when colour work has to be done by artificial light. It forms with air an explosive mixture which is much more dangerous than a mixture of coal-gas and air. The violence of the explosion is much greater and the limits of explosion much wider, as an explosive mixture is formed by mixing any quantity from 3 to 82 per cent of A., while for coal-gas the limits are from 5 to 28 per cent. Copper combines with A. to form an explosive compound, so that if copper gas fittings are used they must be kept well greased to prevent contact. The flame of A. burning in oxygen reaches a very high temp. (about  $3000^\circ\text{C}$ .); the oxyacetylene blowpipe is therefore extensively employed in engineering and metal-working.

Apart from the use already mentioned, A. finds some application as an anæsthetic (under the name of *narcylene*), and is

also the source of valuable non-inflammable solvents such as westrosol (CO<sub>2</sub>, CHCl<sub>3</sub>).

Its principal use is in the manufacture of acetaldehyde (q.v.) and acetic acid.

**Achæa**, one of the auct. great divs. of the Peloponnesus, now the Morea, extending from the R. Larissus along the coast of the Corinthian Bay to Sicronia. It is a narrow strip of land bounded on the S. by the Arcadian Mts., and watered by numerous small streams, many of which are dry in summer. The coast is low and has few good ports. It was originally called *Ægiale*, afterwards *Ionis*, sometimes *Ægialeian* *Ionis*, and was subsequently occupied by the Achæi, consisting of 12 cities or states. After the Rom. conquest of Greece, Achæa comprised all Peloponnesus with N. Greece, S. of Thessaly.

**Achæan Confederation or League**, see **ACHÆI**.

**Achæi** (Achæans), one of the chief Hellenic races, originally dwelt in Thessaly, and thence migrated to Peloponnesus, the whole of which became subject to them with the exception of Arcadia, and the country afterwards called Achæia. Homer frequently calls the whole Gk. race A. When the Heraclids and Dorians conquered Peloponnesus, many of the A. under Tisamenus, son of Orestes, went to the N. coast of Peloponnesus, expelled the Ionians, and called the country Achæia. The A. settled in the twelve cities Pellene, Egira, Egæ, Bura, Helice, Egium, Rhyte, Patræ, Pharæ, Olenus, Dyme, and Tritea, which formed a league for mutual protection, but they played but a small part in affairs until c. 251 B.C. In 281 B.C. they renewed their league to shake off the Macedonian yoke under which they had been subject. Thus began the famous Achæan Confederation or League. In 251 B.C. Aratus united to it his native tn., Sicyon. Corinth, Megaris, Epidaurus, Trezen, and Sparta also joined, and the league became the chief political power in Greece. It was, however, destroyed by the Romans, who under L. Mummius defeated Diæus, the Achæan general, and burned Corinth (then the chief tn. of the league) to the ground, 146 B.C. S. Greece then became the Rom. prov. of Achæa.

**Achæmenes**, the first independent king of a Persian prov., until then beneath Median authority, and founder of the dynasty of Achæmenidæ, to which belonged Cyrus, Cambyses, Darius, Xerxes, Artaxerxes, and others.

**Achæmenidæ**, or **Achæmenidæ**, the name of the dynasty of Persian kings founded by Achæmenes.

**Achard, Franz Karl** (1754-1821), Ger. author of Fr. origin, wrote works on experimental physics, chem., and agric.; was the first to manuf. sugar from beet-root; and became director of the physical class at the Academy of Sciences, Berlin.

**Achates**, accompanied *Æneas* in his wanderings after the siege of Troy. In Virgil's *Æneid* he is called *Fidus Achates*, which is now the term used for any

faithful companion. A. is also the name of a riv. in Sicily.

**Achelous** (or **Aspropotamos**), the largest riv. in Greece, rises in the Pindus Mts. and flows S. into the Ionian Sea, its length being from 120 to 140 m. At its mouth are the Echinades Is., mentioned by Homer, Herodotus, and Thucydides. The god of this riv., the son of Oceanus and Tethys and the eldest of his 3000 brothers, fought with Hercules for Delanira, was conquered, took the form of a bull, again conquered, Hercules taking one of his horns, which, however, he recovered by giving up the horn of Amalthea. The Naiads changed the horn taken by Hercules into the horn of plenty (Ovid, *Metam.* ix. 87). A. was considered to be a great divinity throughout Greece.

**Achenbach, Andreas** (1815-1910), a Ger. painter, was b. at Kassel, Sept. 29, and studied at Düsseldorf, and under Schadow, becoming one of the most remarkable representatives of the school formed by that master. His work consisted almost entirely of landscape paintings—sites in Holland, especially on the canals, the North Sea, the Alps, Norway, Italy, and the Rhine. The titles of some of them are: 'Hardanger Fjord,' 1843; 'Pontine Marshes,' 1846; and 'Fish Market at Ostend,' 1866.

**Achenbach, Oswald** (1827-1905), the brother of Andreas A., was also a landscape painter, his works consisting almost entirely of lt. scenes. Most of his pictures are in the Ger. museums, but the Luxembourg Palace, Paris, possesses his 'Pier of Naples.'

**Achensee, Lake**, the largest and most beautiful lake of the N. Tyrol. It gives rise to the R. Achen, and on its banks are the vils. of Achensee and Achenthal. Its length is 5½ m.

**Acheron**, the name of sev. rivs.: 1. A trib. of the Alpheus in Elis. 2. A riv. in Thesprotia, Epirus, flowing through Lake Acherusia into the Ionian Sea (Liv., bk. viii. ch. xxiv.). 3. A riv. in Bruttii, S. Italy, on which Alexander of Epirus perished (Liv., bk. viii. ch. xxiv.). 4. A riv. in the lower world, round which the shades hover (Virgil's *Æneid*, bk. vi.).

**Acherontia**, see **ACERENZA**.

**Acherusia**, a name given by the Gks. and Roms. to different lakes, marshes, and caverns which were supposed to be connected with the lower world. The Acherusian Marsh in which Acheron finds its source is in Epirus; the Lago di Fusaro into which Acheron is said to throw itself is in Campania.

**Achéry, Jean Luc d'** (1609-85), a Fr. Benedictine monk, b. at St. Quentin. His chief work is a collection of documents concerning eccles. history entitled *Spicilegium*, 1653-77. Also collaborated with Mabillon in the *Acta Sanctorum* of the Benedictines, pub. 1733-8.

**Achi Baba**. A hill in Gallipoli, 709 ft. high, 6 m. from Cape Helles. In the Gallipoli campaign 1915 it marked the limit of the Brit. advance. On its slopes Turkish forces numbering 200,000 men, protected by masses of artillery and

machine guns, in an elaborate trench-system easily withstood repeated attacks by the Brit. 29th and the Anzac divs., notwithstanding supporting fire from the Brit. ships.

**Achiet-le-Grand**, a vil. and railway junction, in Somme dept., France, which, in the First World War, was taken by Gen. Byng's army in 1917; recaptured by the Gers. in the Somme battle of 1918, and finally retaken by Gen. Byng on Aug. 21, 1918. Near it is A.-le-Petit, also hotly contested in the Somme battles.

**Achievement**, see under HERALDRY.

**Achill**, or **Eagle Island**, off W. coast of Mayo, Eire (Ireland). The soil is little cultivated, and the is. is mountainous. Pop. 5260.

**Achillas**, minister of the Egyptian king, Ptolemy XII., with Lucius Septimius murdered Pompey, and was himself put to death by Arsinoë, Ptolemy's sister, in 47 B.C. See Caesar, *De bello Civili*, iii. 4.

**Achillea** (from Achilles, who received knowledge of the properties of plants from Chiron), a genus of plants belonging to the Compositæ. *A. millefolium*, or common milfoil, is found only in colder climates of the N. hemisphere.

**Achilles**, the hero of Homer's *Iliad*, was the son of Peleus, king of the Myrmidones in Phthiotis, Thessaly, and of the Nereid Thetis. He was educated by Phoenix in eloquence and the art of war, and by Chiron, the centaur, in the healing art. He was the bravest of the Gks. in the Trojan war, leading his troops of Myrmidones, Hellenes, and Achæans in fifty ships against Troy. His quarrel with Agamemnon about the beautiful Briseis caused him to discontinue his part in the war. Patroclus, however, persuaded A. to allow him to go to the war with A.'s men and armour, and it was not until Patroclus was slain by Hector, the Trojan commander, that A. returned to the war. He then killed many Trojans, including Hector, whose body he gave up to Priam, the father of Hector. The *Iliad* closes with the burial of Hector; but A. was killed in the battle at the Scaean gate before the capture of Troy. In character he was gentle towards his friends, obedient towards the gods, fierce in battle, and unrelenting in his anger and revenge when roused. There are many other traditions with regard to his hist., but Homer's account is the best known.

**Achilles Tatius**, Gk. poet, b. in the fourth century A.D. at Alexandria, wrote *Leucippe and Clitophon*, a romance in 8 vols. He later became a Christian bishop.

**Achilles' Tendon**, see TENDON.

**Achilleum**, a tn. on the promontory of Sigæum in the Troad which was said to contain the tomb of Achilles.

**Achillini**, Alessandro (1463-1512), surgeon and philosopher, b. and d. at Bologna, was one of the first to dissect the human body. His chief works are: *Corporis humani anatomia*, Venice, 1516, and *Anatomicæ annotationes*, Bologna, 1520.

**Achillini**, Giovanni Filoteo (1466-1538), It. poet, brother of Alessandro, was

also b. at Bologna. Among his works, all pub. at Bologna, are: *Il Viridario*, 1513; *Il Fedele*, 1523; *Annotazioni della lingua volgare*, 1536.

**Achimenes** (from Gk. *â-*, without, *χεῖμα*, winter), a genus of plants of the order Gesneraceæ much cultivated for their flowers. Sev. species are found in tropical America and W. Asia. They grow by means of their rhizomes, the leaves are variegated, and the flowers are various-coloured.

**Achin**, see ATCHIN.

**Achish**, a Philistine king of Gath who sheltered David when he fled from Saul. He was put to death by the latter. See 1 Sam. xxi.

**Achitophel**, the same as Ahitophel, a native of Gilead, Judea, and one of the most prominent counsellors of King David. Later he assisted Absalom in his rebellion (2 Sam. xv. xvi.). He committed suicide by hanging, owing to the failure of his plans through the advice of Hushai (2 Sam. xvii.). The name is used by Dryden to denote the Earl of Shaftesbury in his famous political satire, *Absalom and Achitophel*, 1681-82.

**Achondroplasia**, rickets (*rachitis*) in the newly born; some derangement in the tæxus of the nutritive process resulting in a retardation or abnormality of the development of bone. Many cases are still-born, and those that outlive childhood are peculiarly dwarfed. The cause is insufficiency of lime salts in the cartilaginous tissues, the ends of the bones being particularly affected. This condition may be brought about by insufficient or unsuitable feeding of the mother, or possibly by the action of micro-organisms. See RICKETS.

**Achromatism**, the condition of a lens in which chromatic aberration is absent; that is, where the object as seen through the lens has no coloured border. See ABERRATION; LENS.

**Achromatopsia** (from Gk. *â-*, without, *χρῶμα*, colour, *opsis*, sight), or colour-blindness, is the result of some defect in the retina or the nerve centres causing the person affected to be unable to distinguish between various colours. Sometimes there is one colour sensation alone; in Daltonism, or red-green blindness, red or green is the unseen colour. Ill health at times occasions a temporary state of colour blindness.

**Acid**, in chemistry, a substance capable of splitting off protons (*g.v.*), or which yields hydrogen ions when dissolved in water; or alternatively (but less comprehensively) a substance containing hydrogen which can be replaced by metals with the formation of salts. The earliest A. known to man was vinegar or dilute acetic A., whence the notion of acidity (*acidus*, acid) was bound up with that substance (*actus*, vinegar). Nitric A. and sulphuric A. were known to the alchemists of the Middle Ages as being capable of dissolving substances otherwise insoluble. In 1668 Tachenius observed that all As. could combine with alkalis to form salts. Boyle was therefore enabled to assert the following

properties of As. : 1, they act as solvents; 2, they precipitate sulphur and other bodies from their solutions in alkalis; 3, they turn blue vegetable colouring matter red, which can be turned blue again by addition of an alkali; 4, they react with alkalis to form neutral salts. Lavoisier divided all substances into As., bases, and salts, the chemical characteristic of As. being that they were produced by oxygenation. It was pointed out by Berthollet that prussic A. and hydrogen sulphide acted as As., but did not contain oxygen, and Davy in 1808-10, by investigating the nature of hydrochloric A., helped to overthrow the oxygen theory, which gave place to a dualistic conception by which As. were divided into two classes, oxyacids and hydracids, their salts being known as amphot salts and haloid salts. Later, Berzelius enunciated his electrochemical theory that in chemical combination there is neutralisation of opposing electricities. Every compound is thus divided into 2 parts, 1 positive and 1 negative. Sodium sulphate, for instance, was looked upon as soda and sulphuric A., each of these being again divisible into 2 parts. The effects of electrolysis, however, did not confirm this theory. In 1838 Liebig investigated organic As., and as a result propounded the theory that As. were simply compounds of hydrogen, the replacing of which produced salts. Further, some As. contained more than 1 atom of replaceable hydrogen, so that the formation of different salts of the same metal was explained. As. containing 1 replaceable atom of hydrogen are known as monobasic; those containing 2, dibasic; those containing 3, tribasic; and so on.

The great majority of organic As. are characterised by the presence of a carboxyl group,  $\text{CO-OH}$ , and their basicity is determined by the number of carboxyl groups. The principal groups of organic As. are the aliphatic and aromatic As. The aliphatic As. may be looked upon as derivatives of the paraffins, the alcohols, and the aldehydes; the aromatic As. are derivatives of benzene. Organic As. yield metallic salts with bases, and esters (formerly known as ethereal salts) with alcohols.

Some As. are used in medicine in a dilute form; when strong many of them are powerful poisons. They enter largely into manufs., over two million tons of sulphuric A. alone being produced every year. For the properties and uses of particular As. the separate headings may be consulted.

The chief inorganic As. are: Boracic, carbonic, chromic, hydrochloric, hydrobromic, hydrosulphuric, nitric, nitrous, phosphoric, phosphorous, sulphuric, sulphurous, and hydrogen sulphide.

Organic As.: Acetic, benzoic, citric, formic, gallic, lactic, malic, oxalic, palmitic, salicylic, stearic, tartaric.

Among organic As. not containing a carboxyl group may be noted hydrocyanic (prussic) A. ( $\text{HCN}$ ), cyanic A.

( $\text{HO-CN}$ ), thiocyanic A. ( $\text{HS-CN}$ ), picric A. ( $\text{C}_6\text{H}_2(\text{NO}_2)_3\text{OH}$ ), and uric A. ( $\text{C}_5\text{H}_4\text{N}_2\text{O}_3$ ).

The strengths of As. are compared by measuring their hydrogen-ion concentrations at equivalent dilutions.

The acidity of a liquid is often represented in terms of the symbol  $\text{pH}$ , which stands for  $-\log. (\text{H}^+)$ , where  $(\text{H}^+)$  is the hydrogen-ion concentration in gramme-equivalents per litre. A knowledge of the  $\text{pH}$  of liquids is often very important in medicine, agriculture, biology, food analysis, etc.

Acidalius, Valens (1567-95), commentator and Lat. poet, b. at Wittstock, Brandenburg, wrote excellent commentaries on Quintus Curtius and Plautus, but his poetry is of little worth.

Acid-amides, compounds which may be regarded as being derived from ammonia by the substitution of the acid or acyl groups for atoms of hydrogen. They are called primary, secondary, tertiary, etc., according to the number of atoms of hydrogen displaced. The chief are *acetamide* and *formamide* (q.v.).

Acid Carbonate, see BICARBONATE.

Acilia gens, a famous plebeian house of the Romans, of which the different branches bore special surnames; the three chief names were Glabrio, Balbus, and Aviola.

Acilius, Manius Glabrio, Rom. general, of the Acilia gens, became consul in 191 B.C. During this consulship he subdued Antiochus of Syria at Thermopylae, and also the Ætolians and Bœotians. He celebrated his triumph in Rome in 190 B.C., and a golden statue was erected in his honour.

Acipenser, see STURGEON.

Acì Reale, a tn. of Catania, Sicily, at the foot of Mt. Etna, and at the mouth of the R. Acis. It contains mineral springs, and trades in linen, silk, wine, fruit, sulphur, and wax. In the Second World War damage was done to the roof of the cathedral and also to the dome of S. Sebastiano. Pop. 35,000.

Acis, a Sicilian shepherd, was the son of Faunus and the nymph Symethis. He was killed by a rock from Etna by Polyphemus, the Cyclop, his rival in the love of Galatea. Neptune changed him into the stream Acis at the prayer of Galatea. See Ovid, *Metam.* xiii. 750-968.

Ackermann, Louise Victorine Choquet (1813-90), a Fr. poetess of strength and originality, but of pessimistic philosophy. Her chief works are: *Contes*, 1855; *Premières poésies*, 1863; *Poésies philosophiques*, 1874; *Pensées d'une solitaire*, 1883. See Anatole France, *La Vie littéraire*, 1892.

Ackworth, see PONTEFRACT.

Acland, Sir Henry Wentworth Dyke (1815-1900), Radcliffe librarian, Oxford, for over forty years, and had much to do with the founding of the Oxford Univ. Museum. Pub. a memoir on cholera at Oxford, 1854, and sev. works on health and medicine. Collaborated with John Ruskin in *The Oxford Museum*, 1859.

Aclinic (Gk. ἀ-, without κλίσις, to



bend) Line, known also as the magnetic equator, is an imaginary line passing round the earth where there is no inclination of the magnetic needle.

**Acne**, a common usually chronic inflammatory disease of the sebaceous glands associated with the hair follicles, occurring mostly about the face, chest, and back. The lesions may be papular (consisting of hard pimples), or pustular (containing matter). The disease occurs usually between the ages of puberty and 24 years, is usually worse in winter, and is associated with menstrual and gastro-intestinal troubles. The individual lesions consist of pink, pointed pimples in the centre of which there is a black-topped comedo, or blackhead. Occasionally a parasite, *Demodex folliculorum*, is found in each comedo. Treatment consists in steaming the face and then expelling the blackhead by the use of a small tube. Gentle friction is helpful, and irritation should be allayed by the application of cold cream.

**A. rosacea** is a distinct disease from the above. It is marked by great redness of the nose accompanied by the formation of pimples. Although often called 'brandy nose', it may occur in connection with any derangement of the general health in quite abstemious persons, and is often associated in women with the period known as 'change of life.' Treatment usually depends on the predisposing cause, but local applications of soothing ointments are beneficial.

**Acoemete** (Gk. *ἀκοιμάσαι*, to sleep), an order of Gk. monks founded about the middle of the fifth century who divided among themselves their service in such a manner that it was continuous and unceasing. A Rom. named Studius founded their famous monastery at Constantinople in 471. Pope John II. excommunicated them in 533 for denying the suffering in the flesh, and consequently the incarnation, of one of the Trinity.

**Acolhuas**, **Acolhuans**, or **Alcolhuas**, a tribe of Central Mexico which is said to have founded the settlement of Tezcoco. They were a peaceable people, second in greatness only to the Aztecs.

**Acolytes** (from Gk. *ἀκολουθεῖν* to follow) were youths—in holy orders—who assisted and waited on the bishops and priests, performing such offices as lighting the candles, and carrying the bread and wine at communion. These services are now performed by laymen and boys.

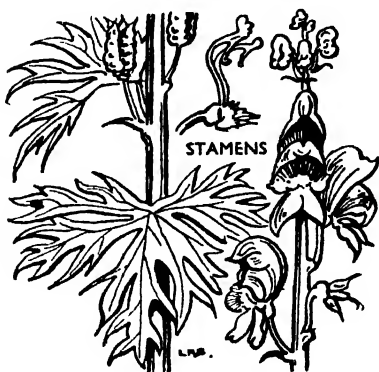
**Aconcagua**: 1. A prov. in Chile, S. America, the cap. of which is San Felipe. It is very mountainous, being bounded on the E. by the Andes. Area about 6000 sq. m.; pop. 480,678. 2. A mt. peak of the Andes, on the frontier of Mendoza, Argentina, and Chile. It is an extinct volcano 23,081 ft. high, and is the highest peak in S. America. First climbed in 1897. See E. A. FitzGerald, *The Highest Andes*, 1899.

**Aconito**, **Giacomo** (c. 1500 - c. 1566), Lat. **Jacobus Aconitius**. It. theologian, was b. at Trent and d. in London. He

became a convert to Protestantism, and dedicated his *Stragemata Salanz*, 1565, to Queen Elizabeth.

**Aconite**, **Winter**, the *Eranthis hyemalis*, a species of Ranunculaceæ common in England. The pale yellow flowers, each growing on a single stalk, appear early in the year before the leaves.

**Aconitin**, a vegetable alkali found in aconite which is one of the most powerful poisons known. It is inodorous, intensely bitter, and produces a tingling sensation which causes it to be useful in the treatment of neuralgia, gout, rheumatism, and heart affections. As a poison it causes death by asphyxiation.



ACONITUM (MONKSHOOD)

**Aconitum**, **Monkshood**, or **Wolf's-bane**, a genus of plants belonging to the Ranunculaceæ, all species of which are poisonous. They are hardy, herbaceous plants, many of them of great beauty, and may be recognised by the galeate, or helmet-shaped posterior sepal. *A. napellus*, the monk's-hood, a common Brit. flower, whose blue helmet-shaped flowers appear in summer, is one of the most deadly species; *A. ferox*, the *bikh* or *bish* of Nepaul, contains the fatal bikh poison in its root. In England *A.* is often called wolf's-bane, and in France *tue-loup*, or kill-wolf.

**A.**, *Properties of*. As plants of this genus are of a poisonous character and contain the alkaloid *aconitin*, great care must be taken to use only *A. napellus* in medicine. The leaves, when chewed, produce a tingling sensation, but the root causes numbness as well as tingling. It diminishes the rate of the pulse and the heart-beats when taken internally, but leaves the brain unaffected. For internal use it is in the form of tincture or extract, and is employed as a sedative to the stomach, and as a relief in fevers and nervous diseases; for external use it is formed into ointments or liniments, and relieves neuralgia. In cases of aconite poisoning, the stomach must be immediately emptied, until when no stimulants

should be given; artificial respiration and application of hot-water bottles to the extremities will also probably be necessary.

**Acontius**, a beautiful youth of the is. of Ceos. In order to gain the love of Cydippe, the daughter of a noble Athenian, he threw before her, while she was sitting in the temple of Diana, an apple, on which he had written: 'I swear by the sanctuary of Diana to marry Acontius.' Cydippe read aloud the words, and threw the apple away; but the goddess had heard her vow, and when she was about to marry another man she fell so ill that her father gave her in marriage to A. Ovid, *Heroides*, 20, 21.

**Acontius**, **Jacobus**, see **ACONCIO**, **GIACOMO**.

**Acorn** is the fruit of the *quercus*, or oak (*q.v.*). It is a nut, being a large, dry fruit, which does not break open to free the seed, and its base is enclosed in a cupule. The A. of *Q. agrifolia* is used, when unripe, for tanning.

**Acorn-shells** is the popular name of the crustacean *Balanus*, of the order Cirripedia and family Balanidae. The testa is white and consists of six pieces; the animals exist in all seas and are attached to rocks, shells, and floating bodies.

**Acorus** is a genus of plants of the Araceae, belonging to the Spadiciflorae, which has two species, *A. calamus*, the sweet flag, and *A. gramineus*, a Japanese flower. The symphydial rhizome has a sweet-scented oil, and by its branching reproduces the plant vegetatively.

**Acosta, Gabriel, or Uriel d'** (c. 1594-1647), a Portuguese, was b. at Oporto of a noble birth. He was brought up as a Catholic, but adopted the Jewish faith, and went to Amsterdam, where he opposed the Jewish teaching. For his *Examen dos tradicoes phariseus*, 1624, he was charged with atheism, punished, and excommunicated. He shot himself in 1647.

**Acosta, Joaquin** (1799-1852), S. Amer. traveller, explored the valleys of the Andes and Socorro to the Magdalena in 1834, and studied Indian tribes in 1841. Chief work, *Compendio histórico del descubrimiento y colonización de la Nueva-Granada en el siglo XVI.*, 1848.

**Acosta, José de** (1539-1600), a Sp. writer, was b. at Leon, was a Jesuit, and became prof. of theology at Ocaña. From 1571 to 1588 he lived in S. America as a missionary; and during that time he wrote a hist. of that continent, which was pub. at Seville in 1590 under the title of *Historia natural y moral de las Indias*. An Eng. translation of this work by E. Grimston was pub. in 1604. He became a great favourite with Philip II. and held various dignities.

**Acotyledones**, or **Acotyledonae**, the name of the first class in Jussieu's natural system of botany, is derived from the circumstance that its plants vegetate without cotyledons, or seed-leaves. It included plants which do not produce seeds, as ferns, mosses, *Selaginella*, and *Equisetum*, and is now called *Cryptogamia* (*q.v.*).

**Acouchi**, popular name of the *Dasyprocta acouchi*, found in Guiana and the is. of St. Lucia and Granada. It differs from the other agoutis (*q.v.*) in possessing a tail of about 2 in. in length instead of a mere tubercule.

**Acoustics**, a term formerly applied to that branch of physics which deals with phenomena associated with sound waves. In recent years, however, there is a tendency to restrict its use to those properties which make a room or hall suitable or otherwise for hearing music and oratory. Sound waves are movements in the air which proceed in all directions from the source. The quality of the sound as heard by the audience is affected by reflection from the surfaces of objects in the building. It may be thought that the larger the number of objects the greater the disturbance will be, but the fact is that with small objects the wave-length is not small in comparison with the apertures through which they pass, the surfaces by which they are reflected, and the obstacles round which they flow. The bad A. of a building are due to large surfaces and large apertures. In a large, bare hall, for example, there is considerable reflection from the roof and walls, so that the sounds heard are mingled with the echoes of those gone before. If the hall is large and has no peculiarities of structure, these echoes may be dissipated into negligible small waves by breaking up the surfaces with drapery, and by the floor being well occupied with chairs and people. All auditors of a concert ought to be in view of the performers to get the right effect, because if the sound waves have to flow round obstacles the small waves are cut off so that the quality of the music is changed. Every one has experienced the change in the effect of the music when a band comes round the corner. At first one hears the drums and heavy instruments; the lighter clarinets, piccolis, etc., contributing their proper effect only when the band comes in full view.

The difficulty from echoes arises only with large halls. It may become pronounced in the presence of smooth concave surfaces; hence it is important that such reflecting surfaces should be rendered absorbent and broken up so that the sound becomes weakened and dispersed. One way to bring about this result is to cover the ceiling and walls and to render the coffers or sunk panels absorbent. As a complete determination of the three dimensions of the possible echoes and focusing effects in an auditorium presents a complicated problem, it is in most cases sufficient to study the sections, and there are several methods of studying the reflecting characteristics of sections. Thus, the necessity for imitating buildings of good design has disappeared with the modern practice of calculation from drawings combined with tests on a model with the aid of ripple-tank and sound-camera.

A common method of locating echoes is by means of the 'echo-spotter,' a

device for projecting a parallel pencil of sound waves of high frequency. The echo-spotter is not used for hall acoustical determination where it is possible to obtain accurate drawings of the auditorium.

The whispering gallery, which is such an interesting feature of some churches, illustrates the effect of echoes; a whisper at one focus of an ellipsoidal roof is reflected at all points in the roof, bringing all reflections to a focus at one point, with the result that the whisper appears magnified many times. The problem of constructing a building with good A. is somewhat difficult to solve, because the building must be up before its qualities in that respect can be demonstrated. Sensitive flames may be used to distinguish the effect of large obstacles and apertures, but experiment in these matters has led to no very satisfactory results. Consult W. C. Sabine, *Collected Papers on Acoustics*, 1927; A. H. Davis and G. W. C. Kaye, *The Acoustics of Buildings*, 1927; H. Bagenal, *Practical Acoustics and Planning against Noise*, 1942.

**Acquapendente**, a tn. in Viterbo, Italy, built on a precipitous mass of rock. It was the native place of Girolamo Fabrizio (Hieronymus Fabricius), an anatomist and prof. of the sixteenth century; and has been the seat of a bishopric since 1650. The portal and roof of the upper church of S. Sepolcro were destroyed in the Second World War. Pop. 7000.

**Acquaviva**, a tn. in Bari, S. Italy, at the foot of the Apennines. Pop. 12,800.

**Acqui**: 1. A prov. in N. Italy, producing corn, fruit, and wine. 2. The chief tn. of the prov. of A. It contains a fine old cathedral, churches, convents, and other buildings, and is the see of a bishop. Its hot sulphur springs are famous (known to the Romans as *Aque Statiellæ*). Here Napoleon defeated the Austrians, 1796. Pop. 15,250.

**Acquati, Luigi** (1744-1824), It. sculptor, was b. at Forlì. The scenes of his labours were Bologna, Rome, and Milan, and his masterpiece is a group of 'Venus and Mars.'

**Acquittal** (from O.Fr. *aquiter*, to free or discharge), the setting free by a court of a person charged with a crime. In an Eng. court there must first be a verdict of 'Not guilty,' in a Scotch court of 'Not guilty' or 'Not proven.' A. by a jury must, however, be confirmed by the judge. If after an A. the person is again charged with the same offence, and if he can prove that he has been formerly acquitted (or pardoned) he is entitled to be discharged.

**Acrolein**, see ACROLEIN.

**Acre** (A.-S. *æcer*, Ger. *acker*, Dutch *akker*, Dan. *ager*, Lat. *ager*, Gk. *ápos*), originally meant an open, ploughed, or sowed field. In England it also meant an open field until the times of Edward I. and Edward III., when an Eng. statute A. consisted of 4840 sq. yds. A chain is 22 yds. long, so that 1 sq. chain = 22 × 22 or 484 sq. yds., i.e., one-tenth of an A. An A. is divided into 4 roods, a rood into 40 perches, and each perch

contains 30½ sq. yds. In the reign of George IV. the A. was fixed for all land measurements throughout the United Kingdom. This is also used in the U.S.A. The old Scotch A. is larger than the Eng. A., and the Irish is larger than the Scotch.

**Acre**, St. Jean d', or Akka (ancient name Acco or Acocho), called Ptolemais during the sovereignty of the Gks. in Syria), a tn. on the coast of Palestine, built on a small promontory which, with Mt. Carmel to the S., forms a circular bay. It was taken by the crusaders, 1104; retaken by Saladin, 1187; taken by the crusaders under Philip Augustus of France and Richard I. of England, 1191, and given to the Knights of St. John; fell into the hands of the Egyptians, 1291; taken by the Turks, 1517; besieged by Bonaparte for 61 days, 1799, but was saved from assault by Jezzar Pasha and Sir Sidney Smith; taken by Ibrahim Pasha, 1832; taken by the Eng., Austrians, and Turks, 1840, Ibrahim Pasha returning to Egypt. Afterwards it was restored to the Turks. In the combined Brit. and Arab offensive against the Turkish armies which was begun on Sept. 19, 1918, under General Allenby, A. was seized, together with Haifa, on Sept. 23. A. is one of the most picturesque places in Palestine. The walls and earthworks—a perfect example of the late eighteenth-century fortress—are almost intact. From the direction of Haifa a good view is obtained of the S. battlements, the ruins of the 'Tower of Flies,' and the remains of the Phœnician breakwater. The tn. itself is entered by an archway in which stand the original iron-plated gates. Within the gate is the 'White Market,' with its curious vaulted roof, and the general markets and bazaars extend along towards the harbour. Among its khans, the most notable is the Khan Shalwarda, which contains old cannon of the time of Sir Sidney Smith. Of its 6 mosques, that built by Jezzar Pasha at the close of the eighteenth century is the most graceful, with its colonnaded courtyard. Under the citadel, which was either built or reconstructed by Abdallah Pasha in 1820, and is now used as a prison, and under the girls' school opposite, are the crypts of the residence of the Knights of St. John. In an adjoining part of the citadel is a small museum containing Phœnician glass and treasures unearthed in the castle of Montfort. About half a m. to the E. of the walls is Tel el Fuhkar, where Richard I. pitched his tent in 1190; and from this place, too, Napoleon directed operations in 1799. A. is connected with Haifa by a narrow-gauge railway which crosses the rivs. Kishon and Belus. The latter still provides the murex, from which the Phœnicians extracted the famous Tyrian purple. See Luke and Keith Roach, *Handbook of Palestine and Transjordan*.

A. is a seaport and exports grain, oil-seeds, olive-oil, and wool. Pop. 6400.

**Acrel, Olof** (1717-1807), Swedish surgeon, who was b. and d. at Stockholm. He entered the Fr. army in 1743 in the

capacity of army doctor. He wrote several surgical works.

**Acrelius**, Israel (1714-1800), Swedish clergyman, was *b.* at Osteraker and *d.* at Fellingsbro. He was educated at Upsala and became a pastor in America; in 1759 he pub. a history of the Swedish colonies in America.

**Acre Territory**, W. Brazil, on the borders of Peru and Bolivia. Famous rubber dist. Pop. 115,000.

**Acri**, a tn. in Calabria Citra. S. Italy; pop. 12,686.

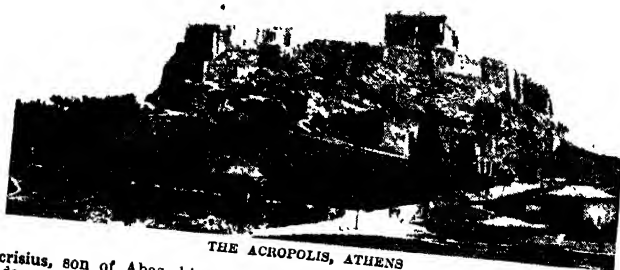
**Acridine**,  $C_{12}H_8N \cdot 2H_2O$ , an organic compound found in crude coal-tar anthracene and utilised in the manuf. of dye-stuffs. It is a crystalline solid, melting at  $108^{\circ}C$ .

**Acrodus** (from Gk. *ἀκρος*, at the top, *ὄδους*, tooth), a fossil fish found in the Triassic system.

**Acrogaster** (from Gk. *ἀκρος*, at the top, *γαστήρ*, belly), a genus of fossil fish of the Beryclidae, found in the Cretaceous system.

**Acrolein**, or **Acraldehyde** ( $CH_3 \cdot CH \cdot CHO$ ), a colourless liquid formed during the partial combustion of fats. The disagreeable smell produced when a tallow candle is extinguished is due to the formation of A. It is an unsaturated aldehyde, boils at  $52^{\circ}$ , has an irritating action on the skin, and its vapours cause a copious flow of tears.

**Acrolepis**, a genus of fossil fish found in the Permian system.



THE ACROPOLIS, ATHENS

**Acrisius**, son of Abas, king of Argos, grandson of Lynceus, and great-grandson of Danaus. He kept his daughter Danaë shut up in a subterraneous apartment, or in a brazen tower, because it was declared that her son would kill his grandfather. When Danaë became the mother of Perseus, A. ordered them both to be put in a chest on the sea. They were rescued by Dictys near the is. of Seriphus.

**Acrobat** (from Gk. *ἀκρος*, tip, and *βαίνειν*, to go), literally means one who walks on tiptoe, but it is the name given to one who performs such dangerous feats as vaulting, tumbling, and walking or dancing on a slack or tight rope. As. were known to the Gks. and Romans, especially for the performance of feats on the rope. In recent times great skill has been exhibited in this art, and Fariolo, Madame Saqui, Diavolo, Blondin, and Con Colleano have achieved fame as As. **Acrocerania**, a promontory in Epirus, jutting out into the Ionian Sea, traversed by the Ceraunil Montes and ending in the present Capo Glossa. The coast of A. was dangerous to ships, whence Horace speaks of 'infames scopulos Acrocerania,' the rocks of ill fame (*Odes*, l. 3).

**Acro-Corinthus** (Gk. *ἀκρος*, a peak), a steep rock, about 1900 ft. high, which is near the city of Corinth, in Greece. It contains the ruins of the acropolis, ancient fortifications, a temple of Aphrodite, and the famous well, Pirene.

**Acromegaly** (from Gk. *ἀκρος*, extreme, *μέγας*, great), a rare disease for which no cure is known, occurring in adults, characterised by the enlargement of the soft tissues and bones of the extremities. See PITUITARY BODY.

**Acromion** (from Gk. *ἀκρος*, extreme, *ὤμος*, shoulder), the apophysis which terminates in man the spine of the scapula, or shoulder-blade; articulates with the extremity of the clavicle, or collar-bone, and gives attachment to the trapezoid and deltoid muscles. See SHOULDER.

**Acon**, a celebrated physician of the fifth century B.C., who was *b.* at Agrigentum in Sicily.

**Acropolis** (from Gk. *ἀκρος*, highest, *πόλις*, city), a fortified hill, rock, or elevation of ancient Greece. Among these strongholds were the A. of Corinth, called Acro-Corinthus; that of Larissa, called Argos; of Mt. Ithome at Messene; of Thebes, called Cadmea; but the chief was the A. of Athens. This (called also Cecropia) was a rock about 150 ft. high, 1150 long, and 500 broad, which in early times had been partially surrounded by the Polagial wall. Here the first kings of Athens built their palace, and a temple before the Persian invasion, existed edifices were the Parthenon, the Propylæa, designed by Mnesicles 437 B.C., a temple of Nike Apteros, the Erechtheum, the sanctuary of Artemis Brauronia, and the Pinacotheca. Many of

the sculptures from the A. were brought to London by Lord Elgin in 1816. See C. E. Beulé, *L'Acropole d'Athènes*, 1853; C. G. W. Bötticher, *Bericht ü. d. Untersuchungen auf d. Akropolis*, 1862; F. C. Penrose, *Principles of Athenian Architecture*, 1888; M. L. D'Ooge, *Acropolis of Athens*, 1908; W. Hege, *Die Akropolis*, 1930; H. Payne and G. M. Young, *Archaic Marble Sculpture from the Acropolis*, 1936.

**Acrostic** (from Gk. *ἄκρος*, at the end, *στίχος*, a line or row), a verse or set of verses whose initial letters form a word, a phrase, or even a sentence. In the *Spectator* Addison notes compound As. in which the end letters have formed the same word as the initial one, and sometimes the same letters have run like a seam through the middle of the verse; it has been found possible to form a pentacrostic even, in which the same name occurs 5 times in so many columns. This poetical conceit is of anct. date. Bishop Eusebius (d. 340) giving in his *Life of Constantine* a set of Gk. verses, said to have been composed by the Erythraean sibyl, of which the initial letters formed the words *Iesous Christos Theou Uios Soter*—Jesus Christ, the son of God, the saviour—the word itself formed the A. *ichthus*, a fish, which thus came to have a mystical meaning. Each div. of Psalm cxix. contains 8 verses, each set of 8 beginning with the same letter, *aleph, beth*, etc. The comedies of Plautus are each preceded by an argument, the initial letters of which, when joined, read as the title of the play, and the Fr. poets from Francis I. to Louis XIV. partook of this literary trifling. The best-known Eng. As. are contained in Sir John Davies's *Hymns to Astraea*, in praise of the queen, which consists of 26 poems, each of 16 lines whose first letters form the words *Elisabetha Regina*.

**Acrotatus** (d. 264 B.C.), son of Areus, succeeded to the throne of Sparta in 265 B.C. Before his accession he successfully combated Pyrrhus, king of Epirus, in the siege of Sparta, 272 B.C.; in the year following his accession he was killed in battle against Aristodemus, tyrant of Megalopolis.

**Acroterion** (from Gk. *ἀκρωτήριον*, extremity), in architecture, a statue, vase, or other ornament placed on the apex or a lower angle of a pediment. The term is sometimes applied to the pedestal on which the ornament stands.

**Act**. In drama, that portion of a play which is divided from other portions by an interval, or *entr'acte*. In the Gk. drama there was no such div. of play, for if the prin. actors were not on the stage the chorus was, but the Rom., like the present-day dramatists, utilised the break in presentation to imply passage of time. Rom. dramatists like Plautus and Terence always wrote their comedies in 5 As., as in later times did Shakespeare and some other Elizabethans, but modern writers often content themselves with three or four—exposition, development, and conclusion.

**A. OF BANKRUPTCY**, in law, denotes an A. the commission of which by a debtor renders him liable to be adjudicated bankrupt if a creditor presents a petition against him within three months of such A. Such As. include assignment of his property to trustees for the benefit of his creditors generally; fraudulent transfers of his property; charges on his property by way of fraudulent preference; departing out of the country or leaving his dwelling-house so as to defeat or delay his creditors; filing a declaration of his insolvency or presenting his own petition; notifying any of his creditors that he is about to suspend payment of his debts; or various other acts described in the Bankruptcy Act, 1914.

**A. OR CONGRESS**.—A bill or resolution which has been passed by both the Senate and the House of Representatives becomes an A. of Congress if accorded the consent of the President. If vetoed by the President and returned for reconsideration, a bill may then become an A. only on being passed a second time by a two-thirds majority in each House. As. of Congress are of two kinds, either public or private, the first being concerned with law and revenue. All resolutions are presented privately by individual members; they may originate in either the Senate or the House of Representatives, except those concerned with revenue, which must be initiated in the latter.

**A. OF GOD** is the term used in law for any untoward occurrence not arising from human cause or negligence, but from natural causes such as could not have reasonably been expected to be foreseen and guarded against. Damage by storms, lightning, floods, or exceptionally high tides or sharp frosts, etc., may be attributed to the A. of God, and in the absence of any contract to the contrary, no person can be held liable for it. Nearly all insurance forms and shipping charter-parties, and most contracts, have a clause relating to non-liability in the case of an A. of God.

**A. OF GRACE**. An A. of the Scottish Parliament which compelled creditors to provide food for their imprisoned debtors who were without means of support. It was amended in the reign of George IV., and since the abolition of imprisonment for debt (1880) it has necessarily lapsed.

**A. OF PARLIAMENT**.—A law made by the joint action of the three estates of the realm—the lords spiritual, the lords temporal and the Commons; in other words, by the king in Parliament. The draft copy of a proposed A. is called a 'bill,' and a bill only becomes an A. when it has received the royal assent. This may be given either by the sovereign in person or by lords commissioners. A bill may be introduced into either House of Parliament with the exception of what are known as money bills, which the House of Lords may neither initiate nor amend. This practice is based upon the resolutions of the Commons of 1671 and 1673, and until the rejection by the Upper House of the famous Lloyd-George budget

of 1909 it was generally assumed that the rejection of a money bill was a breach of the privileges of the Commons. The Parliament Act of 1911 definitely laid down this principle by statute, leaving to the Speaker of the House of Commons the decision as to what constituted a money bill, and in the case of other bills provided for joint sittings of both Houses in case of dispute and for the final passage of a bill into law without the assent of the Upper House if for three successive sessions it had obtained a majority in the Commons. No bill can be introduced more than once in a session, and it has sometimes been necessary to prorogue parliament in order that a bill which has been rejected may be again reintroduced without delay. A bill may be either private or public. A public bill may be introduced by any member of parliament, but nowadays only gov. bills have much chance of passing into law. Public bills are debated in principle on the first, second, and third reading, and in detail in committee or on report. A private bill, i.e. a bill in the interest of some individual or corporation, is introduced by the petition of the parties concerned, and passes through the same stages. If, however, the preamble of a private bill is not 'proved,' i.e. if the special committee to which it is referred after its second reading finds that there is no *prima facie* cause for it, it is thrown out. All As. are public unless otherwise stated, they are binding on all, and do not need to be publicly promulgated, every citizen being presumed to know what is in them. The public As. of the United Kingdom do not apply to the Crown, the Isle of Man, or the Channel Is. An A. may be temporary, and many temporary As. (100 or so) are renewed from year to year by the Expiring Laws Continuance Act. An A. remains in force in England until repealed, but in Scotland As. that have never been repealed are sometimes held to have lost their force owing to lapse of time. In citing an A. the name is given of the sovereign in whose reign it was passed, the year of his reign, and the chapter, i.e. the number of the A. among the other As. of the same session. Thus 6 Geo. IV. c. 62 would be cited for the A. passed in the sixth year of King George IV. to amend the A. of Grace (*supra*).

**A. OF SEDERUNT.**—An ordinance or enactment made by the judges of the Scottish supreme court, the court of session, mainly directed to the end of regulating procedure in the courts and expediting the administration of justice. This power was conferred on the judges by King James V. in 1532, and at one time had wide scope, approaching legislative power, but no such power is now claimed by the Scottish judges. A quorum of 9 judges was necessary to pass an A. of Sederunt.

**A. OF SETTLEMENT.**—An A. passed by a Tory Gov. in 1701 in the reign of William III. which had for its object 'the further limitation of the Crown, and better securing the rights and liberties of the subject.' It was of great

importance in settling the modern constitution of the country and arose out of the need for securing the Protestant succession to the throne. King William and his consort, Mary, were childless, as was also Anne, the heir presumptive, the elder branch of the Stuarts were dead or Rom. Catholics, so the succession was settled on the Electress Sophia of Hanover, a grand-daughter of James I., and her heirs, 'being Protestants.' Her son became George I. In addition to arranging for the succession by a series of 8 important articles, the power of the throne was restricted and certain abuses guarded against. Perhaps the two most important were those relating to the appointment of judges (making them practically irremovable), and asserting the right of parliament alone to declare war.

**A. OF SUPREMACY.**—An A. of 1559, providing that the sovereign should be the supreme head of the realm in all spiritual matters. This confirmed the A. of 26 Henry VIII. c. 1, repealed in Queen Mary's reign.

**A. OF TOLERATION.**—An A. passed in the first year of William III. (1689), and confirmed by 10 Anne c. 2, by which religious freedom (denied by the A. of Uniformity and the Five Mile Act, etc.) was granted to all dissenters from the Estab. Church except Catholics and Unitarians. The civil disabilities of the latter were not removed till the reign of George III., whilst the former were relieved by the Roman Catholic Emancipation Act (10 Geo. IV. c. 7).

**A. OF UNION.**—Although the kingdoms of Scotland and England came under one crown when in 1603 James VI. of Scotland became James I. of England, and although Ireland had come effectively under Eng. dominance about the same time, it was not until 1707 that the Scots and 1801 that the Irish parliaments were merged with the Eng. by the 2 As. of Union. The earlier A. provided that 16 elected peers and 45 members of the House of Commons (now 74) should represent Scotland at Westminster, and the latter A. secured for Ireland a representation in the Brit. parliament of 32 peers and 100 members. The Irish representation was subsequently increased to 103; but, from the creation of the Irish Free State, only N. Ireland was represented, namely by 13 members.

**A. OF UNIFORMITY.**—An A. passed in 1662, in the reign of King Charles II., requiring all ministers to declare their unfeigned assent to the Prayer Book. For failing to do so 2000 were on Aug. 24, 1662, deprived of their livings.

**Acta Diurna** ('Transactions of the Day') was the title of an official journal pub. daily in republican and imperial Rome. It was the nearest approach in ant. times to the modern newspaper, for in addition to official announcements it contained the results of chariot-races, notices of births, marriages, and deaths, etc. During the consulship of Julius Cæsar, 59 B.C., there was pub. for the first time the *Acta Senatus*, an official report

of the proceedings of the Senate. This was discontinued under the empire, but the speeches of the emperor were often so reported.

*Acta Eruditorum*, pub. at Leipzig from 1682 to 1782, was a scientific and literary monthly printed in Lat. The first editor, Otto Mencke, was a prof. of the univ., and his son and grandson succeeded him in the editorial chair. Among its many able contributors was Leibnitz, who first announced in it his method of differential calculus.

*Acta Sanctorum* (Acts of the Saints) is the title of a series of vols., begun in 1643 and still going on, devoted to recording the lives of the saints and martyrs of both branches of the Catholic Church. The work was projected by a Flemish Jesuit, Heribert Rowweyde, in 1607, but it was not till 1643 that John Bolland (*q.v.*) pub. the first vols. Other members of the Jesuit Order who aided or continued the work were named Bollandists after their leader. Sixty-five vols. have already appeared, dealing with the saints in the calendar. At one time the Bollandists received an ann. grant from the Belgian Gov.

*Acta Senatus*, see under ACTA DIURNA.

*Actæa* (from Gk. *ἄκτις*), by which was designated the medicinal plant *Sambucus ebulus*, the dwarf elder. Linnæus transferred the name to some plants belonging to the Ranunculaceæ, which are found in America, Europe, and the N. of Asia. *A. spicata*, the haneberry or herb Christopher, well known in England, has a poisonous purplish-black fruit.

*Actæon*, son of Aristæus, and of Autonoe, a daughter of Cadmus, was a famous huntsman trained by Chiron. Having surprised Artemis bathing with her nymphs, he was changed by the goddess into a stag and devoured by his own pack of 50 dogs. Euripides' version is that he rendered the goddess irate by boasting that he excelled her in hunting. See Euripides' *Bacchæ*, l. 330, and Ovid's *Metamorphoses*, iii. 131-232.

*Actinism* (from Gk. *ἄκτις*, a ray), a term formerly used to express the property supposed to belong to certain rays of light—chiefly solar and lunar—by which chemical changes are produced as in photography.

*Actinium* (Ac), a metal separated out from pitchblende by Doberne. It is radio-active—that is, it emits energy in virtue of its chemical identity, not of any physical relationship to anything else. Its atomic weight is about 230, and its atomic number is 89. See RADIO-ACTIVITY.

*Actinometer*, an instrument invented by Sir John Herschel in 1825 to measure the amount of heat received from the sun upon a given surface in a given time. It consisted of a thermometer with a large cylindrical bulb. Readings were taken in sun and shade, which by subtraction gave the amount of expansion due to direct sunlight. The term *A.* or actinograph is now applied to many types of instruments used by photo-

graphers to estimate the actinic power or sunlight on any given occasion.

*Actinomyces* (Gk. *ἄκτις*, ray, *μύκης*, fungus), an infectious, inoculable, parasitic disease, commonly known as 'lumpy jaw' or 'big jaw,' first observed in cattle, and also sometimes occurring in man, characterised by chronic inflammation, and often resulting in tumours about the jaws.

Bollinger in 1877 gave a description of the ray-fungus (*Actinomyces bovis*), to which he had discovered the disease in cattle was due. One year later, Israel of Berlin discovered the same disease in man. Infection generally takes place through the mouth, teeth, and pharynx, the microbe generally being introduced with food. From an examination of 32 cases Bostrom concludes that the organism enters in association with certain cereals, chiefly barley; and it is noteworthy that those infected have generally been concerned in occupations dealing with cereals.

Most cases of *A.* have occurred in connection with the oral cavity. The patient complains of toothache and of difficulty in opening the jaw. A swelling appears at the angle of the jaw, which passes into suppuration, pus being discharged externally and into the mouth. From this the disease may spread downwards into any organ. Pulmonary *A.* is characterised by a cough and fœtid expectoration, which on examination reveals the presence of the *Actinomyces*. The organism may also infect the intestines, where it grows upon the mucous membrane, leading to ulceration. Perforation of the serous coat of the bowel may occur, leading to peritonitis.

The diagnosis of the disease rests solely upon the discovery of the *Actinomyces*. The hardness of the borders of the ulcers and of the neighbouring muscles in oral *A.*, and the yellow granules in the pus are indications, but must not be considered conclusive until the identification of the microbe.

The course of the disease is chronic. Mild cases may recover in from 6 to 9 months, oral *A.* being the most favourable. Pulmonary *A.* is usually fatal, death resulting from pyæmia.

The treatment is mainly surgical, the part involved being excised, with a free use of disinfectants. Potassium iodide is used internally, often with success, and treatment with penicillin has recently given good results.

*Actinozoa*, in zoology, a class of the Coelentera, animals of a low type of organisation, distinguished by conspicuous radial symmetry, hence the name, from Gk. *ἄκτις*, ray, and *ζῷον*, an animal. They are divided into 2 sub-classes, *Zoantharia* and *Alcyonaria*, the former including sea anemones, stony corals, and black corals, and the latter the precious red coral, sea fans, and sea pens.

The sea anemone, which may be taken as a typical example, has a broad base by which it attaches itself to a rock, a cylindrical column beset with warts or tubercles, and an upper disc which is encircled by numerous tentacles. In the middle of the disc is the mouth, which

leads to a gullet communicating with the stomach cavity, from which other cavities radiate. The animal partly paralyzes its prey (small fishes, sea urchins, etc.) by the use of stinging capsules, and ingests it whole. The corals are distinguished by the formation of a calcareous skeleton.

The class is sometimes known as Anthozoa.

**Action at Law.** In the limited legal acception of the term the word signifies a proceeding in a civil court of law with the object of ascertaining and fixing the rights and duties of two parties. Every person, other than a felon, outlaw, or foreign enemy, has the right to bring an A., either directly or, in the case of legal minors or lunatics, indirectly through their guardians, against any other person except the sovereign, foreign sovereigns, and their representatives. The proceedings in the various courts are different, and certain As. can only be brought in courts for that specific purpose, but the main features are substantially the same in the courts of England and Scotland. The defendant is served with a summons directing him to appear in court, next an attempt is made to ascertain the facts of the question at issue, and when this is determined to endeavour by argument, either supported by evidence or without, to settle which of the parties is in the right. On matters of fact the verdict of a jury is generally considered final, but a judgment on a question of law is generally open to appeal. The expenses or *costs* (q.v.) of an A., though sometimes shared, are usually ordered to be paid by the loser of the A., but in order to prevent abuse the loser may submit these costs to an officer of the court, called a taxing master, who, for a fee, audits or 'taxes' the costs. Either party has the right to demand trial by jury, common or special, except in causes assigned to the Chancery Div., or where the judge by Order 36 of the Supreme Court Rules decides otherwise. Formerly the word suit was used instead of A. when the case was one for *equity*, i.e. in the Chancery Div. The word suit has now been abolished, the powers of equity (q.v.) being conferred on the High Court by the Judicature Acts of 1873-5, but certain As., such as those for the execution of trusts and specific performance of contracts, can only be brought in the Chancery Div. The Scots law never recognised a formal distinction between law and equity, so it is competent to bring all As. before the court of session, if we except certain applications which must be made to the inner house. The old Eng. common law used to divide As. into 3 classes, *real*, *personal*, and *mixed* As., but the modern classification is now into As. for breach of contract (*ex contractu*) or for torts (*ex delicto*). An A. founded on a tort, i.e. any wrong done that is not in the nature of a breach of contract, falls broadly under one of three headings, *non-feasance*, the omission to do what one ought to do, *misfeasance*, the improper

performance of a lawful act, *malfeasance*, the performance of an unlawful act. Scottish As. are also broadly divided as follows: declaratory, to define the nature and extent of the rights of the pursuer; rescissory, to set aside or rescind a fraudulent or erroneous document; petitory, to sue for debt or damages for breach of contract; and possessory, for an injunction restraining from interference with property—in other words, for the maintenance of the *status quo*. An A. upon the case signifies an A. under the common law prior to which particulars of the wrong complained of, or the case, were set down in detail.

As in Eng., so in Amer. practice and procedure, fixed forms of A. have been abolished by the majority of jurisdictions. For these, there is now one single form for all causes. This is the outcome of what is called the Field Code of 1848, so called because it was framed principally by the labours of David Dudley Field (q.v.), who was appointed in 1847 to revise practice and procedure in New York State. This code was subsequently adopted by a large number of other jurisdictions, and its simplicity, free from the inherited jargon of legal pedantry or outworn Lat., is pre-eminently in accord with Amer. ideas. This reform also abolished the distinction between common law forms of A. and other forms, and, like Eng. procedure after the Judicature Act of 1873, it enabled equitable and legal remedies to be provided by one and the same court. But there is no actual fusion of law and equity any more than there is in Eng. procedure. (See under *Equity*.) For the rest, though Amer. procedure is so largely derived from the Eng., there is considerable difference arising from the fact that the Federal and States courts still follow their several systems of procedure.

**Action Française**, a Fr. political right-wing anti-semitic group formed in 1898 during the Dreyfus affair (q.v.) to restore the monarchy under the Bourbon-Orléans family, and having as its organ the paper *L'Action française*. Its political leader was Léon Daudet, its sole deputy in the House of Representatives, and its chief publicist, Charles Maurras, who advocated provincial autonomy, a corporate state and a privileged position for the Church. In 1926 the pope formally condemned the movement, but a reconciliation was effected in 1939. The group, while exercising small direct political influence, has had some considerable influence on other political movements, especially Syndicalism and Fascism.

**Action, Least, Principle of**, see MAXIMA AND MINIMA.

**Action and Reaction** (Motion, Laws of), see NEWTON, MOMENTUM.

**Actisanes**, an anct. king of Ethiopia, who conquered Egypt in the reign of Amasis.

**Actium**, now Akri, tn. and promontory at the entrance of the Ambracian Gulf on the W. coast of Greece. It is celebrated



as the scene of the final overthrow of Antony and Cleopatra by Augustus, on Sept. 2, B.C. 31. Apollo, from his temple on the promontory, received the title of Actius or Actiacus. For description of battle see Dion Cassius, bk. 1.

**Active or Living Force** (*vis viva*). See ENERGY.

**Acton**, municipal bor. of Middlesex, 9 m. W. of St. Paul's. It was a seat of Puritanism at the time of Cromwell, and was the place of residence of Richard Baxter. Henry Fielding, the novelist, and Mrs. Barry, the actress, also resided here. Pop. 57,200.

**Acton**, John Emerich Edward Dalberg-Acton, first Baron (1834-1902), Eng. historian, grandson of Sir J. F. E. Acton, was b. at Naples on Jan. 10, 1834. He studied under Dr. (afterwards Cardinal) Wiseman at Oscott, but received chief teaching from Dr. Dollinger, and became leader of Eng. 'Liberal Rom. Catholics.' In 1895 he was appointed regius prof. of modern hist. at Cambridge, in which year he pub. his *Lectures on the Study of History*. On Newman's retirement in 1859 he ed. the *Rambler*; in 1862 the *Home and Foreign Review*. His *History of Freedom in Antiquity* appeared in 1877, and he projected, but did not live to see the accomplishment of, the *Cambridge Modern History*, 1902-10. He was a devoted admirer of Gladstone, and his *Letters to Mary, Daughter of the 1st Hon. W. E. Gladstone*, were ed. by Herbert W. Paul with an introductory memoir, 1904. See also *Lord Acton and his Circle*, ed. by Abbot Gasquet, 1908; and D. Mathew, *Acton: the Formative Years*, 1946.

**Acton**, Sir John Francis Edward (1736-1811), was b. at Besançon, the son of an Eng. physician. He entered the Tuscan Navy, and reorganised the Neapolitan Navy, becoming generalissimo, minister of finance and Prime Minister at Naples. In 1791 he succeeded to his cousin's title. In 1798 he fled with the king and queen of Naples to Palermo on account of Fr. invasion, but resumed his power on the king's restoration in 1799. In 1806 he again fled with the royal family, and d. at Palermo on Aug. 12, 1811.

**Acton Burrell**, Statute of, passed in 1283 by a parliament which assembled in the par. of this name in the eleventh year of King Edward I. The passing of this statute was indicative of the growing importance of the mercantile class, and its object, as set forth in the preamble, was to make provision for the more speedy recovery of debts. *Inter alia* the statute made arrangements for the distraint of the debtor's goods. Acton Burrell is about 8 m. from Shrewsbury, and it is said that the parliament which assembled there met in a barn.

**Actor**, son of Deion or Myrmidon, was the grandfather of Patroclus, and his descendants were called the Actorides.

**Acts of the Apostles**, The, title of the fifth book of the N.T., the authorship of which is attributed to St. Luke, the physician, the writer of the third Gospel.

The A., like that Gospel, are dedicated to one Theophilus, reference being made to him in the first verse of each book. There is an identity in literary style between the Gospel and the A., and early tradition, nowhere contradicted, assigned the authorship of the Gospel to a companion of St. Paul. It was probably written between 63 and 69 A.D., for the author records the arrival of St. Paul in Rome, but not his death. The A. form the chief source of early Christian hist., their authenticity has never been seriously questioned, and they were recognised by all parties in the early Church as canonical. The book was written in Gk., and is divided into 2 parts, the first 12 chapters dealing with the church in Jerusalem and Judea, with St. Peter as the central figure, and the second, written often in the first person plural, treating of the church among the Gentiles and the journeys of St. Paul. Baur, the most considerable critic of this work, has seen in it support for his theory that the early Church was divided into two factions, the Judaistic, or followers of Peter, and the more liberal or Pauline party. He has even gone to the length of suggesting that the A. of the A. was intended to be an eirenicon between the school of Paul and that of the older apostles. Peter, says Baur, is made to speak the language of Paul, and Paul's attitude to the Judaizers appears much more conciliatory than it really was. Perhaps the most considerable supporter of the traditional authorship of the A. is Sir Wm. M. Ramsay, whose scholarly work *St. Paul the Traveller* has done much to redress the balance of criticism. A. was not quoted often, nor very early, but Papias, who was bishop of Hierapolis in Phrygia in the earlier half of the second century, probably was acquainted with it, as he refers to Philip the Deacon and his daughters (Acts xxi. 9), and Justus Barsabas (Acts i. 23). On the other hand, Eusebius, the biographer of Papias, does not report him as quoting A. Irenæus, Tertullian, Hippolytus, and Clement of Alexandria quote the A. frequently, and echoes of it are to be found in the writings of Ignatius, Polycarp, and others.

**Actuarius**, John, a Gk. physician and writer who lived about the thirteenth century. He is said to have introduced certain drugs into Europe.

**Actuary**, from Lat. *actuarius*, which signified the clerk or shorthand writer who in auct. Rome recorded the *acta* (proceedings) of the Senate or other public bodies. The word passed into England and came to mean the secretary or accountant of a public company, or the clerk or registrar of a court. In the latter sense it is still used for the officer who keeps the minutes of the Lower House of Convocation in the prov. of Canterbury. Now the word is used in a more restricted sense, and practically only applied to an official of a gov. dept. or an insurance company or friendly society whose duty it is to make the calculations

on which are based the premiums or charges made for all forms of insurance. From the foregoing it follows an A. will be skilled in the mathematical laws of probability, and he generally has some legal knowledge, also a certain amount of medical knowledge, to enable him to benefit to the full by the advice tendered by the company's medical officers as to 'good' and 'bad' lives. In 1819 the Gov. created the post of A. to the commissioners of the National Debt, and the Friendly Societies Act of the same year attempted a legal, albeit somewhat vague, definition of an A. in the words, 'a person skilled in calculation.' The number of gov. As. was naturally greatly increased by the National Insurance Act, 1911, and the work of an A. becomes increasingly more onerous. Many As. have consultative practices, and the affairs of the profession are managed by 2 incorporated societies. The more important, the Institute of As., was founded in 1848 and incorporated in 1884; the other body, the faculty of As. in Scotland, founded in 1856, was incorporated in 1868. Both bodies grant diplomas, and their members are respectively entitled to the letters F.I.A. and F.F.A.A. after their names.

**Acuña, Cristóbal de** (1597-c. 1650), Jesuit missionary, was b. at Burgos and d. in Peru. He wrote an account of a journey of exploration down the Amazon, which appeared in 1641 as *Nuevo descubrimiento del gran río de las Amazonas*.

**Acupressure** (from Lat. *acus*, needle, *primere*, to press), a method formerly used of compressing an artery with a needle to arrest a hæmorrhage. The needle is placed perpendicularly to the artery near its opening, crossing over it firmly, and thus stopping the flow of blood.

**Acupuncture** (Lat. *acus*, a needle, *pungere*, to prick), in surgery, puncture of the skin with a needle for the exit of fluid, the relief of pain, etc. It was long used by the Chinese, who believed that by such an operation the harmful vapours which gave rise to certain disorders were exuded from the body.

**Adachev, Alexis** (d. 1561), chamberlain to Tsar Ivan IV., the Terrible, whose violent passions he influenced beneficially. He distinguished himself at the taking of Kazan, 1552, but later fell into disgrace and died in prison at Dorpat.

**Adagio** (from It. *adagio*, leisurely), in music, a term indicating that the movement is slow. It is also used as the name of a piece of music, or as the distinguishing title of a single movement.

**Adair, James** (fl. 1775), trader and historian of the Amer. Indians, emigrated to America in 1735. He adopted the theory that the Amer. Indians, among whom he lived for 40 years, came from the lost 10 tribes, a theory subsequently elaborated by Dr. Boudinot in his *Star of the West*, 1816. His *History of the American Indians*, dealing with their language, habits, and character, is a valuable and interesting work.

**Adalbert**, archbishop of Hamburg-Bremen (c. 1000-72), declined the

papacy offered by Henry III. and desired to found a patriarchate in the N. He exercised great power over Henry IV., whom he educated, and though the nobles accomplished his expulsion from court in 1066, he was recalled in 1069. He assisted in the conversion of the Wends. See *Adam of Bremen's Gesta Hammaburgensis Ecclesie Pontificum*.

**Adalbert, St.** (fl. 700), an Eng. saint, traditionally claimed to have been first archdeacon of Utrecht, and patron saint of Egmont.

**Adalbert, St.** (c. 939-97), b. of a noble Bohemian family, was created bishop of Prague in 982. He preached Christianity to the Hungarians, then to the Prussians and Poles, and was murdered by an unbelieving Prussian priest. He is called the Apostle of Prussia, and his feast is celebrated on Apr. 23. His bones were reinterred in Prague Cathedral in 1880.

**Adalia, Attalíyeh, or Satalíeh**, the anc. Attalia, is a seaport of Asia Minor on the gulf of A. Built on the slope of a hill, the streets rise in tiers above one another, facing the harbour. It exports fruit, timber, and wheat. Its former importance as a port has been greatly lessened by the extension of railways and the unsuitability of its harbour for modern steamers. Pop. about 28,000.

**Adam**, the first created man, or type of man. The word is probably connected with the Heb. root *adam*, red, and is used as a generic name for man in the Heb. and Assyrian languages. In Gen. the article is sometimes prefixed and sometimes not, giving us 2 renderings: 'the man' as the first created individual, and 'man' as a species. It is generally recognised that 2 dissimilar accounts of the creation of A. are amalgamated in the Bible. Gen. i.-ii. 3 designates the Deity as Elohim, whilst from ch. ii. 4 the combination *Yahweh - Elohim* is used, rendered in the Eng. version as 'the Lord God.' The story of A. as narrated in the portion characterised by the term *Elohim* describes his creation as taking place on the sixth day, after the plants and animals had already been made. The more detailed narrative starting at ii. 4 tells of the formation of man from the substance of the earth, and his installation in the Garden of Eden, in the midst of which grew the tree of life and the tree of knowledge of good and evil. The fruit of the latter tree was strictly forbidden him, but he was enjoined to cultivate the other plants and enjoy their fruits. The animals were then formed from earth-substance, and were named by A. God afterwards caused a deep sleep to fall upon him, during which Eve was made from his own flesh. Being induced by the tempter to eat of the forbidden fruit, Eve persuaded A. to eat also, and for this transgression of the law of God both were expelled from paradise to become the progenitors of the human race.

Much has been written in discussion of the question whether the story of A. was intended as hist. or allegory, and on its relationship to the theories of

modern science. In the first place, it is well to point out that a scientific inquiry like that carried out by Darwin aims at classifying facts in order to arrive at the 'laws' or uniformities of nature, leaving out the questions of creation and the ultimate destiny of man. The Genesis account, on the other hand, is an attempt to describe the relationship of God and man, to indicate the hist. of the human race in terms of such facts as may be available; with a direct view to formulating a religious code. As the purpose of the writer is the spiritual elevation of mankind, the facts of creation must be looked upon as typifying spiritual forces, so that hist. and allegory are blended. Man has his origin in inorganic matter; his very existence therefore depends upon the directing power of an Almighty Being; he is, however, given dominion over the animals, which expresses the separation of species, not as a scientific fact, but as a moral necessity (Lev. xviii. 23). The prohibition of the tree of knowledge of good and evil indicates the distrust of culture characteristic of the Jehovistic writers. The introduction of sin by way of the sex element paves the way for much of the teaching of the Pentateuch. Death as the consequence of sin may also be taken fairly literally as the tendency to physical deterioration following upon transgression of the law. The narrative of A. in this way becomes the introduction to the compilation of historical narrative and moral adjuration which we know as the Pentateuch. Many accounts of the creation from other sources contain some of the elements of the Bible story, and it is probable that the original writer selected such items as best illustrated his view of the moral growth of man. Amongst the ancients, Egyptians, for instance, it was believed that men were produced from the mud of the Nile under the influence of the sun-god. Babylonian inscriptions describe a garden with 4 rivers as being connected with an early state of innocence, and there are also indications that the serpent story is of Babylonian origin.

In many versions of the Eng. Bible dates are appended to the different chapters. When dealing with the monarchical period of Jewish hist. it is possible to give dates with a fair amount of certitude, and by adding together the years in the generations of the patriarchs, as given in Gen. v., Bishop Ussher arrived at the date 4004 B.C. as the time of A.'s creation. The value of such a method of computation is now understood to be nil; the beginnings of life must have taken place many millions of years ago, and man has been differentiated from the other animals probably for at least 100,000 years.

Later Jewish stories introduced fanciful accounts of A., as that he was of huge proportions, covering the earth completely. His first wife was Lilith, who fled from him and became a demon when Eve was created. In the Manichean mythology, A. is not represented as a creation of God at all, but as the son of

Satan, prince of darkness, by 'Sin' or 'desire.' Satan had stolen light from heaven, which passed into A., and by diligent fostering by the spirits of good the prospect of light finally overcoming the power of darkness in man was held out as the great hope of the Manichean religion. Eve was given to A. by Satan, and represents the sensual element. She, however, was seduced by Satan; thus Cain and Abel were said to be the sons of Satan and Eve, the offspring of A. and Eve being Seth, who thus carried forward the tradition of light.

A Mohammedan account states that A. performed a penance lasting 1000 years in Ceylon. Augustine suggested that the cause of A.'s expulsion from Eden was not that he was tempted by Eve and fell, but that, after Satan's victory over Eve, A. was led by the power of love to share her shame and punishment. This idea is adopted in *Paradise Lost*; Milton also used the Rabbinical accounts of the celestial hierarchy, Satan being identified with Lucifer, 'son of the morning,' who had fallen from heaven. Another tradition of the Rabbinical writers is that A. was the author of Psalm xcii., the 'Sabbath Psalm.'

An attempt has recently been made to prove that A. was a so-called palæolithic man, to whom the Creator added pre-natally the moral and spiritual qualities which differentiated neolithic man from his immediate forerunners. M. Morris's *New Light on Genesis*, 1926, and *Man Created during Descent*, 1928.

Adam, Adolphe Charles (1803-56), Fr. operatic composer, studied composition under Boieldieu and wrote many comic operas. Among his best works are *Le Châlet*, 1834; *Le Postillon de Longjumeau*, 1838; *Le Roi d'Yvetot*, 1842; *Cagliostro*, 1844; *Le Tordador*, 1849; and the ballet of *Giselle*, 1841. See A. Pougin, *Adolphe Adam, sa vie, sa carrière, ses mémoires artistiques*, 1877; *Souvenirs d'un musicien*, 1901.

Adam, Albrecht (1786-1862), lithographer and one of the finest painters of Ger. battle-scenes, was b. at Norwillingen. He followed Beauharnais in Russia and Italy, and accompanied Radetzky in 1848. Among his best works are 'The Battle of Moscow' and 'The Battle of Leoben.'

Adam, Alexander (1741-1809), Scottish grammarian and teacher of Lat., was b. in Morayshire of humble parents. After a successful career at Edinburgh Univ., he was appointed assistant to the rector of the High School in 1767, and became rector in 1771. Among his students were Walter Scott, Jeffrey, and Brougham. He received his honorary degree of LL.D. in 1780. His *Principles of Latin and English Grammar*, 1772, was rejected by the school patrons, but his *Roman Antiquities*, 1791, obtained continental fame. He also pub. a *Dictionary of Classical Biography* in 1800, and in 1805 a *Lexicon Lingue Latine Compendiarium*. See A. Henderon's *Account of the Life and Character of Adam Alexander*, 1810.

Adam, James (d. 1794), an architect,

is known only in connection with his younger brother, Robert A. (q.v.). He is believed to have designed Portland Place.

**Adam, Jean** (1710-65), Scottish poetess b. near Greenock, is famous as reputed author of *There's Nae Luck about the Hoose*. From being prin. of a girls' school she sank into utter poverty, and d. in a Glasgow workhouse.

**Adam, John** (1779-1825), an Anglo-Indian statesman, son of William A. (q.v.). He became secretary to Lord Hastings in India, and acting governor-general in 1823. He suppressed the freedom of the Eng. press in India, provoking a storm by cancelling the licence of James Silk Buckingham. See *Asiatic Journal*, Nov. 1825.

**Adam, Juliette** (pseudonym of Juliette Lamber) (1836-1936), b. at Verberie, Oise. Married to a lawyer, La Messine, she pub. under that name *Blanche de Coucy, l'Enfance*, in 1858, and followed it up with *Idees antiproudhoniennes sur l'amour, la femme et le mariage*. After her second marriage, in 1863, with Edmond A., prefect of police, she pub. largely under her maiden name, among her later works being the *Siège de Paris*, 1873; *Laide*, 1878; *Greceque*, 1879; *Païenne*, 1883. She founded *La Nouvelle Revue* in 1879, and her salon was politically influential. Works: *Le Roman de mon enfance et de ma jeunesse*, 1902; *Mes premières armes littéraires et politiques*, 1904; *Mes sentiments et nos idées avant 1870* (1905); *Mes illusions et nos souffrances durant le siège de Paris*, 1906; *Mes angoisses et nos lutes*, 1907; *La Vie des ames* (sketches of European War), 1919; *L'Angleterre en Egypte*, 1922; *L'Egypte: une leçon diplomatique*, 1924.

**Adam, Paul Auguste Marie** (1862-1920), Fr. novelist, b. in Paris. His father was 'directeur des postes' under the Second Empire. A. was a Boulangist in the later eighteen-eighties, and an unsuccessful candidate for deputy. His first book was the Zolaesque *Chair molle*, 1885; the second, *Soi*, 1886, a study of feminine egoism. He devoted himself to historical investigation—distinguishing between stories of his own day (*L'Époque*) and those of a former time (*Le Temps et la vie*). He wrote: *Robes rouges*, 1891; *Le Mystère des foules*, 1895. Then came 4 romances of the Napoleonic time—*La Force*, 1899; *L'Enfant d'Austerlitz*, 1902; *La Ruse*, 1903; and *Au soleil de juillet*, 1903—in which he was greatly assisted by the recollections of his grandparents. Other works: *Le Trust*, 1910; *La Ville inconnue*, 1911; *Sûphanie*, 1913. He d. in Paris, Jan. 2, 1920.

**Adam, Robert** (1728-92), Scottish architect, was b. at Kirkcaldy, the son of an architect. He had three brothers, John, James, and William. With C. L. Clérissieu, the Fr. architect, he visited Italy in 1754, and subsequently wrote *Ruins of the Palace of Diocletian in Dalmatia*, 1764. On his election as M.P. for Kinross in 1768, he resigned his office of architect to the King and queen, but still

pursued his professional career. With his brother James he built the Adelphi, which is thus named after them (from Gk. ἀδελφοί, brothers). Other examples of their work, recorded in their *Works in Architecture*, 1773-78, are the screen to the Admiralty Office; Lord Mansfield's house at Kon Wood; the Register Office, Edinburgh; Lansdowne House, London; Glasgow Infirmary, and part of the buildings of Edinburgh Univ. See P. H. Fitzgerald, *R. Adam, Artist and Architect*, 1904; J. Swarbrick, *Life, Work, and Influence of R. Adam*, 1903; A. T. Bolton, *The Architecture of Robert and James Adam*, 1922; J. Lees-Milne, *The Age of Adam*, 1848.

**Adam, William** (1751-1839), politician and lawyer, son of John A. and nephew of Robert and James A. (q.v.). He entered parliament in 1774, and attached himself to Lord North's party. In 1779 he fought a duel with C. J. Fox, wounding him slightly, and later becoming his firm friend. He assisted in the impeachment of Warren Hastings in 1788, took silk in 1790, and was appointed lord commissioner of Scottish Jury Court, 1816. His friendship with Sir Walter Scott is chronicled in Lockhart's *Life*.

**Adam de la Halle** (b. 1240, d. 1285-88), a native of Picardy, known as the Hunchback of Arras, a celebrated trouvère. He wrote *Le Jeu Adam*, or *Le Jeu de la feuillée*, the first Fr. comedy, and at the court of Naples he composed the first known comic opera, *Le Jeu de Robin et de Marion*, c. 1283. A complete ed. of his works, by Coussemaker, appeared in 1872.

**Adam of Bremen**, the Ger. historian and geographer, was b. in the eleventh century, but the dates of his birth and death and definite particulars of his life are unknown. In 1068 he was made canon of Bremen cathedral under Archbishop Adalbert (q.v.), and prin. of the cathedral school. In the years 1072-76 he was engaged in writing the *Gesta Hammaburgensis Ecclesie Pontificum*, his hist. of Hamburg and the spread of Christianity in the N.; the best ed. of this book is by Lappenberg, 1876. He d. on Oct. 12, probably in 1076.

**Adam** (sculptors), a famous Fr. family of sculptors, comprising Jacob Sigisbert A. (1670-1747), an executor of religious subjects, and his 3 sons, all natives of Nancy. Lambert Sigisbert (1700-59) went to Paris in 1719, and after 4 years' study gained the *prix de Rome*. At the command of Pope Clement XII. he executed a design of the Virgin appearing to St. Andrew Corsini, and became subsequently academicien of St. Luke. His other great works are 'La Seine et la Marne,' at St. Cloud; 'Neptune et Amphitrite,' 1740, at Versailles; 'Vénus au bain,' 1742, for the château de Choisy; and 2 marble groups, 'La Chasse' and 'La Pêche,' now at Potsdam. He pub. in 1754 a *Recueil de sculptures antiques grecques et romaines*. Nicolas Sébastien (1705-78) went to Rome with his brother, and was elected academicien for his 'Prométhée déchiré par un vautour,' 1762, now in

the Louvre. Other works are 'Le Martyre de Saint Victor', 1743, and the tomb of Catherine Opallinska, 1749, at Nancy. François Balthazar Gaspard (1710-61) also obtained the *prix de Rome*, and afterwards lived in Berlin as sculptor to the king of Prussia from 1747 to 1750. His works were of mythological subjects, such as 'Apollon', 1748, and 'Diane au bain', 1750. All 4 d. in Paris.

**Adamant** (Gk. *adámas*, unbreakable), now used only poetically for a hard substance, was formerly synonymous with a diamond, and also by false etymology connected with the lodestone.

**Adamantine Spar**, or **Corundum**, an aluminium oxide, the mineral substance ranking second to the diamond in hardness, is found in various coloured and colourless forms. Some coloured varieties used as gems are the sapphire, oriental ruby, oriental topaz, oriental amethyst, oriental emerald, while emery is a dull granular specimen. It is found in China, India, Canada, and some parts of Europe.

**Adamawa**, or **Fumbina** region, W. Africa, lying partly in Nigeria and partly in the Cameroons. It is included in the N. areas of the mandated ter. of the Cameroons. It has a good climate and, apart from the scrub-lands, a fertile soil rich in many tropical products, but it is mainly a cattle-rearing country. The N. part of A. is traversed by sev. trade routes connecting Bornu and Dikwa with Yola and Garua. Over these routes go the natron and black salt from the N. to Benue, and in addition to this through traffic, is carried a large tonnage of ground nuts and locally woven textiles. Iron ore is smelted in the country. It is watered by the Benue Riv., a trib. of the Niger. Exports hides and skins, ground nuts and shea nuts. It is named after a chief Adama, who founded the Yola emirate. The chief tn. is Yola (Brit.), and other tns. are Nauman and Jalingo (Brit.) and Garua, Ngaundéré, and Lame (Fr.). Pop. 400,000.

**Adamites**, the name of a Gnostic sect of the second century in Africa, who sought to re-establish the innocent state of man at the time of the creation, going naked and rejecting marriage. The doctrine was prevalent among some of the Beghards or Brethren of the Free Spirit in the fourteenth century, and a similar sect appeared in Bohemia and Moravia in the fifteenth century. They were massacred by Ziska in 1421.

**Adamnan**, or **Adomnan**, famous as the author of the *Life of St. Columba*, was b. about 623, of a race called Hy-Neill, in Ulster. He received his education at the monastery of Clonard. In 679 he was appointed abbot of the Columban brotherhood at Iona. While visiting his pupil Aldfrid, King of Northumbria, he became converted by the Venerable Bede to an acceptance of the Rom. observances at Easter, and to the adoption of the regulation tonsure. He endeavoured to inculcate the same change of view among the brotherhood,

but failed, although some success attended similar efforts in Ireland. In 704 he d. Among his works is a Lat. discourse entitled *On the Holy Places*. Another work is *Adamnan's Vision*. The work that stands out as the most significant, both in its value in literature and for its enlightenment, is his *Biography of St. Columba*. The best ed. is by Dr. Reeves, for the Bannatyne Society, 1874.

**Adams, Charles Francis** (1807-86), Amer. diplomatist, son of John Quincy A. (q.v.), b. at Boston, Massachusetts. Studied diplomacy under his father at an early age in Russia and England, and returning to Harvard graduated in 1825. Studied law, and sat in the Massachusetts House of Representatives and Senate. Sat as a Republican in Congress; was appointed minister to Great Britain in 1862. He opposed the sailing of the *Alabama*, and succeeded in influencing Lord John Russell in stopping the *Alexandra* and 2 ironclads intended for the Confederate states. He left England in 1868 and sat at the Geneva Conference (1871-72). He ed. the works of John A. (1850-56) and the memoirs of John Quincy A. (1874-77). See *Life* by his son, C. F. Adams, jr., 1900.

**Adams, Charles Francis** (b. 1866), great-great-grandson of John A., second president of the U.S.A. Educated at Harvard, and then practised law. Mayor of his native city 1896-97. Treasurer Harvard Univ. Corporation 1895-1929. Was amateur navigator on the yacht *Resolute* when it won international yacht races 1920. Appointed by President Hoover to Cabinet post of secretary of the navy, 1929. Was one of the Amer. delegates to the London Naval Conference in Jan.-Mar. 1930.

**Adams, Clement** (c. 1519-37), author and schoolmaster, was b. in Warwickshire, educated at Eton and Cambridge. He pub. an account of Richard Chancellor's voyage to Russia in his *Anglorum Navigatio ad Moscovitas*, 1599, the first Eng. venture into that country.

**Adams, Francis** (1796-1861), an Aberdeenshire physician and classical scholar. His chief publications are: *Hermes Philologus*, 1826; translations of Paulus Aegineta, 1844-47, Hippocrates, 1849, and Aretaeus, 1856.

**Adams, Henry Brooks** (1838-1918), Amer. historian, grandson of sixth president of the U.S.A.; b. Boston. Graduated Harvard, 1858. Travelled in Europe 1858-60; in England 1861-68 as secretary to his father, Chas. Francis A., the Amer. minister. His *History of the United States from 1801 to 1817* (pub. 1889-90) is a standard treatise. Wrote, besides many essays and studies, *Life of George Cabot Lodge* (1911), and an autobiography called *The Education of Henry Adams* (1918). D. at Washington.

**Adams, John** (1735-1826), second president of the U.S.A., was b. at Quincy, Norfolk co., Massachusetts. Educated at Harvard (1755), he was called to the bar in 1758. He was one of the Massachusetts representatives in the Congress in 1774, and a promoter of the

Declaration of Independence, 1776. He became ambas. to Holland, 1782; to Great Britain, 1785; President of the U.S.A., 1797-1801. He pub. a *Defence of the Constitution of the U.S.* in 1787. See also *UNITED STATES, History*. See bibliography to *Works*, ed. by C. T. Adams, 1850-56; *Letters of Abigail and John Adams*, 1840-41; *Familiar Letters of J. Adams to his Wife*, 1870; M. Chamberlain's *John Adams*, 1898; J. T. Morse's *John Adams*, 1885.

Adams, John Couch (1819-92), astronomer, was b. near Launceston. He and Leverrier share the honour of having discovered Neptune in 1846 after noting the irregularities in the motion of Uranus. In 1860 he was appointed prof. of astronomy at Cambridge.

Adams, John Quincy (1767-1848), sixth president of the U.S.A. and eldest son of John A. (q.v.), second president, was b. at Quincy, Norfolk co., Massachusetts. He studied diplomacy in Europe under his father in 1778; returning to America he graduated at Harvard, 1787. He became ambas. at The Hague, 1794; to Prussia, 1797; to Russia, 1809; in London, 1815; secretary of state of the U.S.A., 1817; President, 1825-29; defeated by Jackson in 1829, he returned to Congress in 1830. See *Memoirs of J. Q. Adams*, ed. by C. F. Adams, 1874-77; *J. Q. Adams*, by J. T. Morse, 1883; *The Adams Family*, by Jas. Thurlow Adams, 1930. See also *UNITED STATES, History*.

Adams, Maude (b. 1872), b. in Salt Lake City, Utah. Her mother being an actress in a stock company, Maude began playing child parts at a very tender age, becoming in her young womanhood one of America's favourite actresses. Created for the first time in America many of the star parts in plays by Barrie and Edmond Rostand. Was an intimate friend of Sir James Matthew Barrie.

Adams, Samuel (1722-1803), an Amer. statesman, was b. at Boston, Massachusetts, U.S.A., and graduated at Harvard College, 1740. He took the popular side in the disturbances caused by the Stamp Act, 1765, and in the same year was made a member of the legislature of Massachusetts. He signed the Declaration of Independence, 1776, became lieutenant-governor, 1789-94, and governor until 1797, of Massachusetts. He devoted his life to the cause of the independence of America, and wrote political essays. He was called the American Cato.

Adams, Thomas, a Puritan preacher who fl. from 1612 to 1653, was called by Southey 'the prose Shakespeare of Puritan theologians'. He wrote sermons and theological works, and from 1612 to 1623 held the positions of preacher at Willington, Bedfordshire, vicar of Wingrave, Buckinghamshire, and preacher at St. Gregory's under St. Paul's Cathedral.

Adams, William (1576-1620), an Eng. navigator, was b. at Gillingham, near Chatham, and was apprenticed as a sailor when 12 years old. He became pilot-major to a fleet from Rotterdam

which, though bound for India, reached Japan, where A. lived until his death, becoming second in command of an Eng. settlement founded 1613, and making voyages to Siam and Cochin China.

Adams, t.n., Berkshire co., Massachusetts, U.S.A.; manufs. cotton, wool, and paper. Pop. 12,700.

Adam's Apple. 1. In common parlance, the boss or projection caused by the thyroid cartilage of the larynx, chiefly marked in the male. 2. In botany, is the *Citrus limetta*, or sweet lime, a pale yellow, roundish fruit with a boss at the point. Its name, *pomo d'Adamo*, was given by the Italians, who thought the depressions on the surface resembled the mark of Adam's teeth. It belongs to the Rutaceæ, the orange and lemon family.

Adam's Bridge, Indian Ocean, is a chain of sand-banks which with the is. of Manaar and Rameswaram extend from Ceylon to the S. coast of India. It has sev. navigable channels for small boats. In the *Ramayana* it is said to have been constructed by the monkey-god Hanuman for the passage of Rama from Madras to Ceylon.

Adam's Needle, see YUCCA.

Adam's Peak, the highest point of Ceylon, is 7420 ft. high. It obtains its name from the popular Mohammedan belief that Adam's penance took place here after his expulsion from Eden.

Adamson, John (d. 1653), was prin. of Edinburgh Univ., 1625-53; prof. of philosophy at St. Andrews Univ., and prof. at Edinburgh, 1589-1604. He became vicar of N. Berwick and of Liberton; ed. *The Muses' Welcome to James VI.* on his return to Scotland, 1617, and was the author of sev. poems and theses.

Adamson, Patrik (1537-92), a Scottish prelate, was b. at Perth, graduated M.A. at St. Andrews, 1558, and became minister of Ceres in Fife, 1563. In 1566 he went to France, returning about 1572, when he became minister of Paisley, chaplain to the regent, and archbishop of St. Andrews, 1576. He came into conflict with the Church, was sent as ambas. to Elizabeth by James VI., 1583, was charged with heresy and excommunicated, 1585. He was afterwards pardoned, but again excommunicated, 1588. He was the author of many theological works in Lat., both prose and verse.

Adamson, Robert (1852-1902), was prof. of philosophy at Manchester, 1876, and of logic at Aberdeen, 1893, and Glasgow, 1895. Among his works on philosophical subjects are: *Roger Bacon: The Philosophy of Science in the Middle Ages*, 1876; *On the Philosophy of Kant*, 1879; and *The Philosophy of Fichte*, 1881.

Adamson, Thomas, a master-gunner, wrote *England's Defence, a Treatise concerning Invasion*, 1680.

Adana (Seyhan), a vilayet (pop. 383,700) and city in Turkey. The city is situated on the Sihoon about 30 m. from the coast of the Mediterranean. It exports wool, cotton, and grain, and is a railway station. Pop. 76,500.

**Adanson, Michel** (1727-1806), a Fr. naturalist, was b. at Aix, and d. at Paris. He was destined for the Church, but gave up the study for that of natural hist. In 1748 he went to Senegal, where he made collections in every branch of natural hist. His *Natural History of Senegal* was pub. in 1757; he became a member of the Academy of Science, 1759; and his *Families of Plants* appeared 1763. He then commenced to compile an *Encyclopædia of Natural History*, but was reduced to misery and poverty during the Fr. Revolution. He was, however, invited to become a member of the Institute of France, and received a small pension from the Fr. Gov.

**Adansonia**, see BAOBAB.

**Adapis**, a mammiferous fossil found in the plaster-of-Paris quarries of Montmartre, given this name by Cuvier. The bones are incomplete, the dentition is reduced, and the animals, which belonged to a family of extinct lemurs, were about the size of a rabbit.

**Adaptation** (Lat. *adaptare*, to fit to), the process of acquiring a fitness for new circumstances or new purposes. In literature and music, the term is used to denote the modification of some form of art to allow or its suitable expression in another form. Thus we speak of the A. of a play from a novel; or of a poem to music, where certain stanzas are omitted to suit the considerations of length usually called for in a song.

In biology, A. means the variations in the structures of animals occasioned by the necessity for continuing to live or procreate under somewhat altered circumstances. The term is sometimes carelessly used as if it meant a kind of conscious striving after fitness, but when we say that a frog is adapted to its surroundings, we simply mean that it cannot live the life, say, of a cod-fish. In the process of evolution of a species, variation in characteristics occurs in 2 ways. First, there is the influence of heredity, which tends to perpetuate certain characteristics, perhaps in the direction of the parent away from the type, or as reverting to the type away from the parent. If the direction taken is one that leads to survival, the animal lives to carry on what is perhaps a long process of A. But every individual has a certain power of reacting to its environment, and tends to alter itself in its own life-hist. If the variation achieves the object of survival, it may be called an A. Thus we may say that every distinctive characteristic originated in an A., even when it is being slowly modified in the direction of extinction, for such modification is the response to the demand for an economy in which all that is useless must be abandoned.

**Adar**, the last month of the Heb. year, corresponding to our Feb. **Veadar** (lit. 'and Adar') was the intercalary month introduced into 7 of the cycle of 19 years.

**Adda** (Rom. *Addua*), a riv. in Lombardy, rises in the Rhaetian Alps, near Bormio, enters Lake Como, traverses the plain of Lombardy, and flows into the

Po about 8 m. above Cremona. Length, 182 m.

**Addams, Jane** (1860-1935), Amer. sociologist, b. at Cedarville, Illinois. Studied economic questions in Europe and America; in 1889 she helped to found in Chicago Hull House, a social settlement. She shared the Nobel peace prize in 1931, having done much to relieve post-war distress in Europe. (See her work, *Twenty Years at Hull House*, 1910.) For 3 years she held the post of inspector of streets and alleys. See *Democracy and Social Ethics* (1902); *New Ideals of Peace* (1907); *The Spirit of Youth and the City Streets* (1909).

**Addax**, a genus of antelopes belonging to the Hippotraginae and allied to the oryx, found in N. Africa and Arabia. The *A. nasomaculatus* is a large animal with a white band round its muzzle, called by the Arabs *Abou-Addas* and by Pliny *Strepsiceros* on account of its twisted horns.

**Adder** (A.-S. *nædre*, serpent), a name applied to sev. poisonous snakes of the Viperidae and to some non-poisonous Colubridae. *Vipera* (or *Felias*) *Berus*, the European A., attains a length of 28 in., and its bite is seldom fatal. Wycliffe applies the term to the serpent in the Garden of Eden.

**Adder's Tongue**, the popular name for the fern *Ophioglossum vulgatum*, which belongs to the Ophioglossaceae and is found in Britain. It develops only 1 leaf each year, and reproduces vegetatively by means of buds on the root.

**Addington, Henry**, see SIDMOUTH, VIS-COUNT.

**Addis Ababa**, or **Addis Abeba**, a tn. of Shoa and cap. of Abyssinia, containing the palace of the wife of Menelik, who here signed a treaty with Italy on Oct. 26, 1896. Bombed and taken by the It. in Apr. 1936, when the emperor's palace was sacked and the tn. given over to a pillaging mob. Pop. (estimated) 100,000.

**Addiscombe**, a district of Croydon, Surrey, contained the college for cadets of the E. India Company, in which were trained sev. notable men, among others Sir Henry Lawrence, Lord Napier, and Lord Roberts. Pop. 14,000.

**Addison, Christopher**, first Baron (b. 1869). Brit. politician and medical prof. After a period as medical prof. at Sheffield he was elected Liberal member for Hoxton, 1910, becoming first parl. secretary to the Board of Education and then minister of munitions. Minister for health, 1919-21, when he inaugurated the medical panel in the National Health Insurance scheme and organised the Coalition Gov.'s housing scheme. He resigned during disputes over the latter scheme and joined the Labour party. M.P. for Swindon 1929, but was defeated in 1931. Minister of agriculture and fisheries, 1930-31; re-elected 1934 but again defeated in 1935. Raised to the peerage in 1937. Ex-chairman of Marketing Re-organisation Commission. Secretary of state for dominion affairs, 1945-47. Lord Privy Seal and leader of the House of Lords, 1947.

**Addison, Joseph** (1672-1719), essayist, poet, and statesman, was b. May 1, 1672, at Milston rectory, near Amesbury, Wiltshire, the son of Lancelot A., who was dean of Lichfield, 1683. He was educated at Amesbury, Lichfield, and Charterhouse, where he was a fellow pupil with Richard Steele. At the age of 15 he went to Queen's College, Oxford; but 2 years later he obtained a scholarship and went to Magdalen College, where he obtained a demyship, 1689, and his M.A. degree, 1693. His facility in writing Lat. verse first brought him into notice, and his verses addressed, in 1694, to Dryden procured him the friendship and interest of that distinguished poet. He became acquainted with Lord Somers and Mr. Montagu, afterwards Lord Halifax, and it was through the influence of the former that he obtained, in 1699, a pension of £300 to enable him to travel on the Continent to qualify for diplomatic service. On the death of William III. he lost his pension, and returned to England late in 1703. In 1704, after living for some time in London in a state of poverty, he was appointed by the Gov. to write a poem to celebrate the victory of Blenheim. This poem, entitled *The Campaign*, was so successful that he was appointed a commissioner of appeals, and held sev. appointments, 1704-10. He became under-secretary of state, 1706, accompanied Halifax to Hanover, 1707, and was appointed secretary to Lord Wharton, lord-leutenant of Ireland, 1708. In 1709 Steele began the *Tatler*, and A. soon became a contributor, taking a leading part in its production. The first number of the *Spectator* appeared 1711, and it was continued until Dec. 1712 by A. and Steele. Then followed the *Guardian*, the first number of which was pub. in Mar., and the 175th and last in Oct. 1713; Steele was the editor, and A. a contributor. In the same year A. brought out his celebrated tragedy of *Cato*, which procured for him still greater fame than any of his former productions had done. In June 1714 appeared the first number of a continuation of the *Spectator*, to which A. contributed until its termination in Dec. 1714. His prose comedy *The Drummer* was pub. 1715, but it was not a success. He then commenced a periodical publication in support of the Gov. under the title of the *Freeholder*. It consisted of 2 papers a week, and was continued until June 1716. In the same year he married the dowager Countess of Warwick, and was appointed secretary of state, 1717. However, he retired from office, 1718, on the ground of ill health, but really in consequence of his entire inaptitude for debate in parliament, and for the ordinary business of his office. His health soon began to fail, his domestic life was not happy, and he d. at Holland House, Kensington, June 17, 1719.

As a poet and dramatist A. formerly held a much higher place than he now does; his greatness lies in the fact that he is one of the most famous of all Eng.

essayists. His style is easy, polished, and graceful, and his essays are characterised by a delicate sense of propriety, a lively fancy, and a most original and exquisite humour. He was the founder of a new school of popular writing, and his works had the object of raising the manners and standard of life of the people, and of forming a good taste and sound opinion. Although many have attempted to imitate him, none have surpassed him, and his contributions to the *Tatler*, *Spectator*, and *Guardian* are both amusing and instructive, and suited alike to the gay and the serious. In character he was supposed to have been somewhat cool; nevertheless he was kind and magnanimous; and the ease and grace of his manners and conversation made him both popular and admired.

Eds. of works are: Tickell's, 4 vols., 1721; Baskerville's 4 vols., 1761; Hurd's, 6 vols., 1811, reissued in Bohn's Brit. Classics, 1856; Greene's, 1856; Dent's *Spectator*, 1907. Lives in *Biographia Britannica*, *Dict. of Nat. Biog.*, Johnson's *Lives of the Poets*, by Lucy Aikin (1843), W. J. Courthope (1884), and by B. Dobree, *Essays in Biography*, 1925; Macaulay's *Essay*; Drake's *Essays Illustrative of Tatler, Guardian, and Spectator*; Pope's and Swift's *Correspondence*, etc.

**Addison's Disease**, a constitutional disease characterised by degeneration of the suprarenal capsules, discoloration of the skin, and progressive anaemia and asthenia.

It was discovered by Thomas Addison of Guy's Hospital, who described it in 1855 in his book, *The Constitutional and Local Effects of Disease of the Suprarenal Capsules*.

The suprarenal capsule is a small triangular organ situated above the kidney; its function is doubtful, but it is believed to have some relation to pigment production, owing to the peculiar influence of the disease on the coloration of the skin. A substance whose active principle is adrenalin is secreted by the glands, and it is thought that the perversion or inadequacy of this substance is the cause of the disease.

The most marked symptom is the gradual bronzing of the skin, particularly where pressure is customarily brought to bear on the body, as by garters, braces, etc. The discoloration is not conclusive evidence, for it may be due to one of many other causes; but progressive asthenia, lowered blood pressure, unaccountable vomiting and diarrhoea, and mental weakness are confirmatory symptoms. The disease usually lasts about a year, and death has occurred in the majority of cases. Some hope has been raised that the administration of the extract of the suprarenal glands may effect a cure, many cases having been notified where great improvement in general vigour has followed upon that treatment.

**Addison's Walk**, in Magdalen College grounds at Oxford, a walk which Addison is said to have frequented.

**Addition** (Lat. *addere*, to put to) is the



putting together of 2 or more magnitudes.

In arithmetic and algebra it is the first rule denoting the putting together or adding of sev. numbers or quantities of the same kind into 1 number or quantity, called the sum or total. The sign of this operation is +, pronounced plus, the Lat. for more. Thus 2+3 means the number 2 added to the number 3, and  $a+b$  means the quantity  $a$  added to the quantity  $b$ , and represents the sum of  $a$  and  $b$ .

**Addled Parliament.** The, the nickname of James I.'s second parliament, which sat in 1614, and did not pass a single Act. The king wished to obtain supplies without settling the question of imposts, but to this the members—among whom were Pym and Wentworth—would not agree, and James therefore dissolved it.

**Address, Forms of.** The form of A. to and between persons has lost much of the ceremony that characterised the custom a few generations ago. Many of the methods and terms used to-day would then have been serious breaches of etiquette, but are adopted now with a great freedom from the ceremony. The forms of A. should be as follow:

**Ambassador, British.**—Address: 'His Excellency (according to rank), H.B.M.'s Ambassador and Plenipotentiary,' then 'Sir,' or 'My Lord,' etc., according to status. In conversation use 'Your Excellency.' Respecting the ambas.'s wife, the form 'Your Excellency,' though not correct, is often used.

**Archbishop.**—His Grace the Lord Archbishop of —, My Lord Archbishop. Later references in the same communication, 'Your Grace.' In formal documents to the Archbishop of Canterbury the following is used: 'The Most Reverend Father in God, Geoffrey Francis Fisher, by Divine Providence Lord Archbishop of Canterbury, Primate of All England and Metropolitan.' To the Archbishop of York: 'The Most Reverend Father in God, Cyril, by Divine permission Lord Archbishop of York, Primate of England and Metropolitan.' Irish archbishops are 'The Most Reverend the Archbishop of —,' but if the archbishop is a temporal peer 'The Right Hon. and Most Rev. is used.

**Archdeacon.**—The Venerable the Archdeacon of —, Venerable Sir. Afterwards the same.

**Baron.**—The Right Hon. Lord —, or 'The Lord —, My Lord.' Refer to 'Your Lordship.'

**Baron's daughter.**—If unmarried, 'The Hon. (Christian name and surname).' If married, 'The Hon. Mrs. (husband's surname).' Begin 'Madam.' If married to a baronet or knight, 'The Hon. Lady (husband's surname).' Begin 'My Lady.' If married to a peer, or the son of a duke or marquess, A. accordingly.

**Baron's son.**—The Hon. (Christian and surname). Begin 'Sir.' In Scotland the eldest sons of Scottish peers are addressed, 'The Hon. the Master of (peerage title).'

**Baron's son's wife.**—The Hon. Mrs. (husband's surname). Begin 'Madam.' If the daughter of an earl, marquess, or duke, A. accordingly.

**Baroness, in own right or husband's.**—The Right Hon. the Baroness —, 'The Right Hon. Lady —,' or 'The Lady —,' Begin 'My Lady.' Refer to 'Your Ladyship.'

**Baronet.**—Sir (Christian name and surname), Bart. Begin 'Sir.'

**Baronet's wife.**—Lady (surname). Begin 'Madam.' Reference 'Your Ladyship.'

**Bishop, abroad.**—See Bishop, Scottish. **Bishop, English.**—The Right Rev. the Lord Bishop of London, or 'The Lord Bishop of London.' Commence 'My Lord Bishop.' Refer to as 'Your Lordship.' A bishop is addressed in formal documents as 'The Right Rev. Father in God, Arthur, by Divine permission Lord Bishop of London.'

**Bishop, Irish, consecrated before 1868.**—As Eng. Bishop.

**Bishop, Irish.**—'The Right Rev. the Bishop of Ossory,' or referring to the Bishops of Meath and Tuam, 'The Most Rev.' Commence 'Right Rev. Sir,' or 'Most Rev. Sir.'

**Bishop, retired.**—The Right Rev. Bishop —, or 'The Right Rev. —, D.D.' Begin 'Right Rev. Sir.'

**Bishop, Scottish.**—The Right Rev. the Bishop of St. Andrews, Dunkeld, and Dunblane, 'The Bishop Primus is usually addressed, 'The Right Rev. the Primus.'

**Bishop, Suffragan.**—The Right Rev. the Bishop Suffragan of Bedford. Commence 'Right Rev. Sir.'

**Clergy.**—The Rev. (Christian and surname). Begin 'Rev. Sir.' If the son of a duke or marquess, 'The Rev. Lord.' If the son of a viscount or baron, 'The Rev. the Hon. (Christian name and surname).'

**Companion of an order of Knighthood.**—The ordinary form is used with the addition of the initials C.B., C.M.G., C.I.E., as the case may be.

**Consul, British.**— —, Esq., 'H.B.M.'s Agent and Consul-General,' or 'Consul-General,' or 'Consul,' or 'Vice-Consul,' according to rank.

**Countess.**—The Right Hon. the Countess of —, Commence 'Madam.' Refer to as 'Your Ladyship.'

**Dean.**—The Very Rev. the Dean of —, Begin 'Very Rev. Sir.'

**Doctor.**—The ordinary form of A. is used with the addition of the initials D.D., M.D., LL.D., Mus.D., etc.

**Dowager.**—The widow of the holder of a peerage becomes a dowager on the marriage of her son. She is addressed as 'The Dowager Lady —.' The same title can be held by more than one person, hence the term is used less frequently today, and an alternative form, e.g. 'The Right Hon. Helen, the Countess of —,' is used, distinction being made by the use of the Christian name.

**Duchess.**—Her Grace the Duchess of —, Begin 'My Dear Madam.' Refer to as 'Your Grace.'

*Duke.*—‘His Grace the Duke of —.’ Commence ‘My Lord Duke.’ Further reference, ‘Your Grace.’

*Duke's daughter.*—‘The Right Hon. Lady (Christian name and surname),’ or ‘The Lady (Christian name and surname).’ Commence ‘Madam.’ A. later as ‘Your Ladyship.’ If married to a peer, A. in husband's rank.

*Duke's eldest son and his children.*—The courtesy title is treated as if it were an actual peerage. The eldest son takes the grandfather's third title and is addressed as a peer.

*Duke's eldest son's wife.*—As if she were the wife of an actual peer.

*Duke's younger son.*—‘The Right Hon. Lord (Christian name and surname).’ Commence ‘My Lord.’ Refer later to as ‘Your Lordship.’

*Duke's younger son's wife.*—‘The Right Hon. Lady,’ or ‘The Lady (husband's Christian name and surname).’ Commence ‘Madam.’ Later refer to as ‘Your Ladyship.’

*Earl.*—‘The Right Hon. the Earl of —,’ or ‘The Earl of —.’ Commence ‘My Lord.’ Refer later to as ‘Your Lordship.’

*Earl's daughter.*—See Duke's daughter.  
*Earl's eldest son, and eldest son's wife.*—Regard the title, which is by courtesy, as an actual peerage.

*Earl's younger son and his wife.*—See Baron's son and his wife.

*Governor-General of Dominion or Colony, Governor of Colony.*—‘His Excellency the Governor-General (or Governor) of —.’ Rank will determine the beginning. Refer as ‘Your Excellency.’

*Judge, English or Irish.*—‘The Hon. Sir —,’ if a knight, or ‘The Hon. Mr. Justice —.’ Commence with ‘Sir.’ He is only addressed as ‘Your Lordship’ on the bench.

*Judge of County Court.*—‘His Honour Judge —.’ Refer to, when on bench, as ‘Your Honour.’

*Judges, Scottish.*—Same as Lord of Session.

*Justice of Peace, in England only.*—When on bench only use ‘Your Worship.’

*King.*—‘The King's Most Excellent Majesty.’ Commence ‘Sir,’ or ‘May it please Your Majesty,’ or in the case of a Lord, ‘Lord —’ presents his duty to Your Majesty.’ Reference, ‘Your Majesty.’  
*King's Counsel.*—Ordinary A. with K.C. added.

*Knight Bachelor.*—Same as Baronet with Bart. omitted.

*Knight of the Bath, of St. Michael and St. George, or of the Star of India.*—‘Sir (Christian name and surname),’ with the initials G.C.B., K.C.B., K.M.G., or K.S.I., according to designation. Commence ‘Sir.’

*Knight of the Garter, or of the Thistle, or of St. Patrick.*—Ordinary Knight A. with initials K.G., K.T., or K.P. added.

*Knight's wife.*—See Baronet's wife.

*Lord Advocate of Scotland.*—‘The Right Hon. the Lord Advocate.’ Begin ‘My Lord.’

*Lord Chancellor.*—‘The Right Hon. the Lord High Chancellor.’ Rank will determine beginning.

*Lord Chief Justice.*—‘The Right Hon. the Lord Chief Justice of England.’ If a peer commence according to status, otherwise, same as Judge.

*Lord High Commissioner to the General Assembly.*—‘His Grace the Lord High Commissioner.’ Commence according to peerage rank. Reference, ‘Your Grace.’

*Lord Justice-Clerk.*—‘The Right Hon. the Lord Justice-Clerk.’ Commence ‘My Lord,’ and refer to ‘Your Lordship.’

*Lord Justice-General of Scotland.*—‘The Right Hon. the Lord Justice-General.’ Begin with ‘My Lord,’ and refer to ‘Your Lordship.’

*Lord Justice of Appeal.*—‘The Right Hon. the Lord Justice —,’ or ‘The Right Hon. Sir —.’ Begin and refer to as for Judge.

*Lord Mayor of London, York, or Dublin.*—‘The Right Hon. the Lord Mayor of London,’ or ‘The Right Hon. —,’ Lord Mayor of London.’ Commence ‘My Lord,’ and refer to ‘Your Lordship.’

*Lord Mayor's wife.*—‘The Right Hon. the Lady Mayoress of —.’ Commence ‘Madam.’ Refer to ‘Your Ladyship.’

*Lord of Appeal in Ordinary and wife.*—See Baron and Baroness. (Children do not take any title.)

*Lord of Session in Scotland.*—‘The Hon. Lord —.’ Commence with ‘My Lord,’ and refer later to ‘Your Lordship.’ The wife has no title.

*Lord Provost.*—‘The Right Hon. the Lord Provost of Edinburgh,’ ‘The Hon. the Lord Provost of Glasgow,’ ‘The Lord Provost of Aberdeen or of Perth.’ Commence with ‘My Lord Provost,’ or ‘My Lord.’ Refer to ‘Your Lordship.’ Wife has no title.

*Maid of Honour.*—‘The Hon. Miss —.’ Commence ‘Madam.’

*Marchioness.*—‘The Most Hon. the Marchioness of —.’ Commence ‘Madam.’ Refer to ‘Your Ladyship.’

*Marquess.*—‘The Most Hon. the Marquess of —.’ Commence ‘My Lord Marquess.’ Refer to ‘Your Lordship.’

*Marquess's daughter.*—See Duke's daughter.

*Marquess's eldest son.*—See Duke's eldest son.

*Marquess's younger son.*—See Duke's younger son.

*Mayor.*—‘The Right Worshipful the Mayor of —.’ Begin ‘Sir.’ Refer to ‘Your Worship.’

*Member of Parliament.*—M.P. is added to the usual form of A.

*Minister Resident.*—Esq. (or according to rank), H.B.M.'s Minister Resident.

*Officers in the Army and Navy.*—The professional is prefixed to any other rank, e.g. ‘Admiral the Right Hon. the Earl of —,’ ‘Lieut.-Col. Sir —,’ ‘K.C.B.’ Officers below captain in the Army or commander in the Navy are usually addressed by their civil rank with the initials of their corps, e.g. R.A., R.E., added.

*Premier.*—According to rank.

*Prince.*—‘His Royal Highness the Duke of —,’ if a duke. Otherwise

'His Royal Highness Prince (Christian name).' In both cases commence 'Sir.' Refer to 'Your Royal Highness'

*Princess.*—If a duchess 'Her Royal Highness the Duchess of \_\_\_\_.' Otherwise 'Her Royal Highness the Princess (Christian name).' Commence 'Madam,' and refer to 'Your Royal Highness.'

*Principal of a Scottish Univ.*—If a clergyman 'The Very Rev. the Principal of \_\_\_\_,' or 'The Very Rev. Principal (surname).'

Correspondence between equals loses much of its formality, e.g. 'My dear Lord,' Persons of no superior rank usually adopt 'Sir,' 'Dear Sir,' or 'My dear Sir,' according to the degree of familiarity existing between them. To a firm 'Gentlemen' or 'Sirs' is usually the form.

In the U.S.A., the President, Governors, and all Ambassadors are addressed as 'His Excellency.' The Vice-President, heads of Executive Depts., Justices of the



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#### ADELAIDE: NORTH TERRACE EAST

On the left is the national war memorial, the three buildings to the right are the circulating and public libraries and the museum.

*Privy Councillor*—'The Right Hon.' followed by name and title. Rank will determine beginning and reference.

*Queen.*—'The Queen's Most Excellent Majesty.' Commence 'Madam' or 'May it please Your Majesty.' Otherwise, 'Lord \_\_\_\_ presents his duty to Your Majesty.' Reference 'Your Majesty.'

*Recorder.*—'Sir,' 'Your Worship,' 'The Worshipful' (London only), 'Right Worshipful.'

*Secretary of State.*—'His Majesty's Principal Secretary of State for the \_\_\_\_ Department.'

*Sheriff of London*—'The Right Worshipful.'

*Viscount.*—'The Right Hon. the Lord Viscount \_\_\_\_,' Commence 'My Lord.' Refer to 'Your Lordship.'

*Viscountess.*—'The Right Hon. the Viscountess \_\_\_\_,' or 'The Viscountess \_\_\_\_.' Begin 'Madam.' Refer to 'Your Ladyship.'

*Viscount's daughter, son, and son's wife.*—See Baron's daughter, son, and son's wife.

Superior Courts, Mayors of towns, Senators, Congressmen, Consuls, and Lieutenant-Governors, and heads of State depts. are addressed as 'The Hon.'

Adelae, Curt Siwertsen (1822-75), a Dutch admiral of Norwegian birth, who assisted Venice against the Turks, and was so successful in many naval battles that Frederick III., king of Denmark, made him admiral of the Dan. fleet, 1863, and gave him the title of Curt. He became admiral-general, and was in command of the Danish fleet in the war against Sweden, when he died suddenly.

Adelaide, the cap. of S. Australia, on the Torrens R., 7 m. by rail from Port Adelaide on the gulf of St. Vincent. It was founded in 1837, and named after the queen of William IV.; and owing to the discovery of gold soon became an important city. It is situated on a large plain, bounded on the S. and E. by the Mt. Lofty Range, and is the one Australian city planned at the outset with some coherent regard for principles. There are no slums. Modelled on the Gk. ideal,

A. is commonly named 'the Athens of the S.' Admirable foresight was shown in the laying out of the city, which is square in form and divided by the R. Torrens into 2 parts, the N. being the residential, the S. the business centre; the suburban area, however, has expanded considerably all around the city. The belt of park lands encircling the city, preserved in the original plans, has been maintained and now provides A. with one of its notable charms. Bridges communicate between the N. and S. parts, and the

public buildings are those of the univ., which plays a large part in the cultural life of the city and the state; the Anglican cathedral of St. Peter's; and the Rom. Catholic cathedral. The botanic gardens and park and zoological gardens are 120 ac. in extent. A. is connected by rail with Sydney, Melbourne, Perth, Brisbane, and other important tns. and is the terminus of the overland telegraph from Port Darwin. There are also trolley and motor buses, and the tramway systems' metropolitan and suburban routes



Belford Lemaire

ADELPHI TERRACE (OLD)

streets are wide and well paved. The chief business dists. are Rundle and Hindley, Currie and Grenfell Streets, while King William Street, about a m. long, is one of the finest traffic avenues in Australia. Four roadways facing the cardinal points of the compass, known as North, South, East, and West Terraces, are in the S. part. The classic *pièce de résistance*, approached from the new railway station, is North Terrace, which is planned like a Parisian boulevard with lawns and flower-beds. Here are situated the museum, art gallery, parliament house (built of S. Australian marble), Gov. House, the hospital, and the leading clubs. A. is rich in marble statues. The national war memorial of marble, very large in scale, representing the Prologue and Epilogue of War, stands in front of Gov. House. A bronze equestrian statue at the corner of King William Street commemorates the S. Australians who fell in the S. African war. There is also a bronze in Creswell Garden near the A. Oval to the memory of Sir Ross Smith, K.B.E., M.C., the aviator. Other notable

cover 149 m. of single track. The water supply is good and is obtained from the catchment areas of the Onkaparinga and Torrens, and is stored in 5 reservoirs. A. is the emporium for S. Australia, exporting through Port A. wool, wheat, flour, and silver and copper ore. There are hardware, sheet-metal, and motor body building works. Pop. 370,000.

Adelaide, Queen (1792-1849), the eldest daughter of George, Duke of Saxe-Meiningen; married William, Duke of Clarence, 1818 (afterwards William IV. of England). She helped to raise the standard of life at court. See M. Hopkirk, *Queen Adelaide*, 1946.

Adelard, Eng. philosopher of twelfth century and one of the greatest savants of medieval times. His *De Eodem et Diverso* (On Identity and Differences), in which he represents philosophy and the world as being in conflict for the soul of man, establish him as the founder of the doctrine of indifference, according to which genus and species retain their identity in the individual.

**Adeler, Max** (Charles Heber Clark) (1841-1915), an Amer. author and journalist, on the editorial staff of the *Evening Bulletin*, Philadelphia, and ed. the *Manufacturer*. Among his works—mostly humorous—are: *Out of the Hurly-Burly*, which procured him world-wide fame in 1874; *Elbow-Room*, 1876; *Random Shots*, 1879; *An Old Fogey*, 1881; *Fortunate Island*; *Captain Bluit*, 1901; *In Happy Hollow*; and *The Quakeress*, 1905. Though in literature the most irresponsible of jesters, he was a very serious politician—a high tariff protectionist.

**Adelie Land**, a portion of Antarctica, or piece of coastal land in what is known as the Victoria quadrant of the Antarctic continent. It lies on long. 140 E. and, according to the principle on which land in Antarctica is allocated among different claimants, would no doubt extend southward indefinitely. It was first visited by Dumont d'Urville (q.v.) in 1840, Charles Wilkes (q.v.) landing on the same coast in the same year. It is now a dependency of the Fr. colony, Réunion.

**Adelphi**, a London purlieu in the neighbourhood of Charing Cross. A Terrace, one of the thoroughfares, for long remained partly a residential quarter, owing its popularity to the fine view of the Thames. George Bernard Shaw resided there for some years. A street in the dist. was named after each of the four brothers Adam (see ADAM, ROBERT), the founders of the Adam style of architecture; but the former William Street is now Durham Street. Many of the Adams' buildings, including the terrace, were demolished in 1936 under a reconstruction scheme.

**Adelsberg**, a tn. in Carniola, Yugoslavia, situated to the N.E. of Trieste. It is famous for the caves in the neighbourhood. The chief, the A. Cave, about 8000 ft. long, consists of sev. grottoes with enormous stalactites. The R. Poik, or Puika, flows through the cavern, forms sev. cascades, and disappears through a fissure in the rock. In parts of this riv. the tailed amphibian *Proteus* is found. Pop. commune, 7090.

**Adelung, Johann Christoph** (1732-1806), a celebrated Ger. linguist and grammarian, was b. at Spantekon, Pomerania, and d. at Dresden. He devoted his time to translation work, philology, and languages, and was librarian to the electoral library, Dresden, from 1787. His works include: *Deutsche Sprachlehre für Schulen*, *Umständliches Lehrgebäude der Deutschen Sprache*, *Grammatisch-kritisches Wörterbuch der Hochdeutschen Mundart*, and *Mithridates oder allgemeine Sprachkunde*.

**Ademption** means the revocation or taking away of a grant or legacy. Thus if a testator leaves a specific article in his will, and before his death the nature of the article or property bequeathed is entirely changed, or the property is destroyed, the legatee is said to suffer from A., i.e. he gets nothing. The word

is also used in the legal sense of 'satisfaction,' e.g. if a testator owing money make a creditor a beneficiary under his will to the same amount as the debt, or more, then the legacy is held to have extinguished the debt.

**Aden**, a Brit. tn. and Crown colony, which also gives its name to the gulf of the same name and to the adjoining protectorate. It is the most populous and important port of Arabia, and the total pop. of the colony is 47,000 in an area of 75 sq. m. The tn. stands at the end of a rocky peninsula (which is joined to the mainland—Yemen—by a narrow sandy isthmus not 1 m. wide), and is heavily fortified, being indeed the only fortified point between Egypt and Bombay, and therefore regarded as an outpost of the Indian Empire. The Camp, as it is called, or A. proper, stands in the crater of an extinct volcano. Arid rocks surround it, rising at the highest point to 1776 ft., and the mean annual temp. is 83° in the shade. The other 2 centres of pop. are Steamer Point and Shaikh Othman, towards the interior. A., a most prosperous tn. under medieval Turkish rule, was, at the time Captain Haines annexed it after an almost bloodless coup (1839), inhabited by only 600 Arabs. The magnificent system of rain-collecting cisterns built by the Turks have been repaired by the Brit., and are the chief source of water supply. By the convention with Turkey the old boundary delimited in 1905 was extended to a point on the coast opposite Bahrein (q.v.) on the Persian Gulf. Administrative control used to be exercised through the Gov. of India, the Colonial Office being responsible for political questions. In 1932 it was separated from the Bombay Presidency and formed into a prov. under a chief commissioner under the direct control of the Gov. of India. But it ceased to be a part of Brit. India in 1937, and is now a crown colony under a governor, who is assisted by an executive council. In the First World War, A. was attacked by the Turks in July 1915 (Action of Lahaj), in Dec. 1916 (skirmish at Jahir), and Oct. 1918 (skirmish at Imad), but successfully defended throughout. A railway was constructed for military purposes to Lahaj, and has now been extended to Habi, the total length being 34 m. The chief industries are salt and cigarette manuf., and the total sea-borne trade is worth any amount over £6,000,000. The trade of A. decayed after the Portuguese discovery of the Cape route, but with the opening of the Suez Canal A.'s old importance revived, and it is now a most important oil bunkering and coaling station and port of call, besides being an emporium for the trade of the adjacent African and Arabian coasts. The Brit. Gov. has treaty engagements with, and subsidises, the neighbouring Arab tribes from the strait of Bab-el-Mandeb to Muscat ter. at Ras Dharbat. There is a court of unlimited civil and criminal jurisdiction, called the Supreme Court, from

which certain appeals lie to the High Court at Bombay.

Perim, a small unfortified is. of 5 sq. m. (pop. 1700), is administratively attached to A. The is. of Kamaran on the Red Sea about 200 m. N. of Perim, taken by Britain in 1915, is also under the control of the gov. of Aden. It is 22 sq. m. in extent (pop. 2200), and is chiefly important as a quarantine station for pilgrims from farther E. to Mecca, the station being (1947) under the joint control of the Gov. of India and that of the Netherlands E. Indies.

to Ras Dharbat 'Ali, where it meets the sultanate of Muscat. The Mahri sultanate of Qishn and Socotra is the most easterly part of the A. protectorate, being bounded on the E. by Muscat and Oman. The sultan of Qishn resides on Socotra Is. (1400 sq. m.), which lies 150 m. from Cape Guardafui. This is. was occupied by the E. India Company in 1834 and came under Brit. protection in 1886.

Adenitis (Gk. *αδην.* a gland), a term used in medicine to indicate inflammation of the glands and ganglia, but especially



ADEN HARBOUR

Fox Photos

**4. Protectorate.** A protectorate of approx. 112,000 sq. m. with an estimated pop. of 600,000, divided into a W. part, consisting of a score of sultanates, the chiefs of which are in protective treaty relations with the Brit. Gov., they include the sultan of Lahej (who came over to represent his country at King George VI's coronation in 1937); and an E. part, comprising the Hadhramaut (consisting of the Quaiti state of Shihir and Mukalla, whose chief also came to London for the coronation, and the Kafiri state of Seyun), the sultanate of Qishn and Socotra, and the Wahid sultanates of Bir 'Ali and Balhaf, all of which enjoy protective treaty relations with Britain. The Hadhramaut is the most important and best organised of the areas of the E. protectorate. The whole protectorate to the W. of about 46° long, is bounded on the E. by the Qara country, which is part of the ter. of the sultan of Muscat and Oman, and on the N. and W. by the Great Desert and the kingdom of the Yemen, whose S. boundary was provisionally fixed by the treaty of Sanaa (1934), by which the Brit. Gov. and the Imam Yahia of the Yemen agreed to maintain the *status quo* frontier as it was at the date of the treaty. The coast-line of the protectorate, which is about 600 m. long, begins in the W. from Husn Murad, opposite Perim, and runs eastward

of the lymphatic glands. It may be either acute or chronic; in the former case it generally comes from a skin wound or sore, the glands swell and are extremely painful; in the latter case the cause may be syphilis or tuberculosis, in which the glands swell and symptoms of both diseases are generally found. The treatment for acute A. is absolute rest, and the use of antiseptic lotions; for chronic A. strengthening diet, sea air, and local applications are most beneficial.

**Adenoids, or Adenoid Growths,** enlargement of the lymphatic tissues at the back of the nose and throat. The condition occurs mainly in young children, and may be discovered by laboured breathing, liability to catarrh, obstruction in speech, and a characteristically stupid and apathetic expression. The growth lessens in size as the child grows older, but as it involves a grave danger in the event of any acute respiratory trouble, it is often advisable to remove it by a simple operation.

**Aderno, a Sicilian tn.,** about 20 m. N.W. of Catania, which stands on the site of the anct. tn. of Hadranum, noted for its temple of Hadranus. It is situated on the slopes of the volcano Etna, has sev. fine churches and an anct. Norman tower and monastery built by Roger I., 1157. Pop. 26,000.

**Adersbach Rocks** are made of sandstone and are found in the vicinity of 2

vils. of the same name in Bohemia. They are 4 m. in length and of grotesque shapes. The pop. of the vils. is 1500.

**Adhesion**, in physics, the molecular force between masses or particles of different substances, as distinct from cohesion, the force between parts of the same substance. In botany, it is also used to denote the union of dissimilar parts. In pathology, it denotes the union of 2 surfaces by the production of lymph after inflammation. It causes trouble after pleurisy or peritonitis and also in burns, when the fingers or toes may become united. It is beneficent when the edges of a wound are united, thus constituting 'healing by first intention.'

**Adiabene**, a region of Assyria E. of the Upper Tigris, conquered by Trajan. In the Christian era it was trib. to the Parthians.

**Adiantum**, a genus of ferns of the Polypodiaceae, which usually inhabit damp tropical woods. *A. Capillus-Veneris*, the maidenhair fern, is found rarely in Europe. About 180 species of *A.* are known.

**Adiaphora** (Gk., indifferent things), a word signifying such actions as the Stoic philosophers held lay in the border region between good and evil. What is known as the Adiaphoristic controversy at the time of the Ger. Protestant Reformation arose from a dispute over certain Catholic tenets. Seeking to reconcile his Catholic and Protestant subjects, the emperor Charles V. in 1548 drew up a temporary ritual and rule of faith pending the settlement of the matter by a general council. The *A.* were those customs and tenets declared in the Leipzig Interim by Melancthon and his followers to be indifferent. Luther and his supporters were bitterly opposed to this suggestion.

**Adige** (*Ger. Etsch*), a riv. rising in the Rhaetian Alps in Italy and flowing into the Adriatic not far N. of the Po. It is, next to the Po, the largest riv. of Italy, having a length of 250 m. It is deep, and below Verona has a width of about 500 ft., but its rapid current makes navigation difficult. Many important battles have been fought on its banks.

**Adigherat**, or **Adigrat**, a small tn. of Tigré, Abyssinia, which, prior to the It. invasion of 1936, had an important market. Near it is Mt. Aleghia.

**Adi Granth**, the sacred book of the Sikhs, was ed. by Arjun Mal (the fourth *guru* or chief priest from the founder of the sect) about the end of the sixteenth century.

**Adipic** (Lat. *adeps*, thick) **Acid**, a crystallised solid acid, obtained by the oxidation of certain fatty or waxy bodies. It is a dibasic acid, akin to oxalic and succinic acids.

**Adipocere**, a wax-like substance produced by the exposure of fleshy tissue to moisture with the exclusion of air, as in the earth or under water. Human bodies in moist burial-places often undergo this change.

**Adipose Tissue**, a collection of fat

within the body of an animal. It consists of minute cells containing a secretion of oily matter. *A.* substance is what is known as a connective tissue, that is, it constitutes a sort of packing material between the harder tissues which form the framework of the body. Its uses are to protect the organs from external changes of temp., and to constitute a reservoir of material which may serve as food when other supplies fail. An excessive amount of *A. T.* is developed in the course of some diseases.

**Adirondack Mts.**, a very beautiful group in the N. of New York state, U.S.A. They may be regarded as the continuation of the Alleghenies, and they terminate abruptly in sheer cliffs on the shore of Lake Champlain. They stand on a plateau 2000 ft. above sea level, cover an area of 5000 sq. m., and their highest peak, Mt. Marcy, or Tawahus, has an alt. of 5345 ft. The dist. abounds in lakes and waterfalls, and here are the head streams of the Hudson. A forest reserve of 4375 sq. m. is owned by the state. A certain amount of lumbering is carried on, but the region is principally noted for being a favourite summer resort.

**Adit**, a horizontal entrance to a mine, sometimes called a drift. See MINING.

**Adjective** (Lat. *adjectivum*, neuter of *ad-jektivus*, that is, added) is the name of one of the parts of speech used with a noun, or substantive, to express a quality of the thing named; something attributed to it; to limit or define it, or to specify or describe a thing, as distinct from something else. Thus in the phrase 'a good man,' 'good' is the *A.*, and expresses the quality of the man.

**Adjudication**, An order of, in Eng. law, and a decree of sequestration in Scots law, is the order of a court adjudging a debtor a bankrupt and appointing a trustee to administer his estate. In Scots law *A.* means a process to attach the heritable property of a debtor—not necessarily a bankrupt. See BANKRUPTCY.

**Adjustment of Average**, a term used in marine and fire insurance, but mainly in the former, to denote the settling of the amount to be paid by the underwriters to the insured person and each underwriter's share of the loss. The rules relating to the amounts to be made good vary in different countries. In the absence of agreement, adjustment of the amounts to be contributed in respect of general average will take place at and according to the law of the port of discharge, i.e. in general, the place to which the vessel is destined, unless the voyage is justifiably terminated at an intermediate port. See INSURANCE.

**Adjutage**, or **Ajutage**, a tube attached to an orifice through which water is discharged. See HYDRAULICS.

**Adjutant**, an army officer, not above the rank of major, often a captain, and sometimes a subaltern, who assists the officer commanding a battalion or regiment, particularly in the carrying out of the detail work. His duties are

multifarious and include that of al-de-camp in the field. He has charge of the correspondence and official records, he keeps the accounts. The officers' duty roster is prepared by him, he issues by the authority of the commanding officer the daily orders, and generally is responsible for the discipline and efficiency of the corps. He supervises the drilling of recruits, and acts as prosecutor in all courts martial that concern his men. The appointment is held for about 4 years; in the auxiliary forces for 5 years. The *A.-General*, who is the second military member of the Army Council, has duties toward the Army as a whole somewhat similar to those of the A. to his corps, i.e., he is entrusted with all matters pertaining to discipline and efficiency of the troops.

Adjutant (*Leptopithecus argala*), a bird of the stork family found in various parts of India, but more especially in the N. and near water. It resembles somewhat the marabout stork of Africa, but is larger, and when erect it stands about 5 ft. high and measures from tip to tip of its extended wings about 15 ft. With its almost bald head and neck and its pouch (sometimes 16 in. in length), which hangs like a dewlap from the lower part of its neck, the bird presents an uncouth appearance. It has a voracious appetite, no carrion or offal or putrescent matter apparently being distasteful to it.

Adler, Herman (1839-1911), son of Nathan Marcus A. (q.v.), and succeeded his father on his death, 1891, in the chief rabbinate of the Jews of the Brit. Empire; b. in Hanover, became prin. of Jews' College, 1863, and in 1879 became coadjutor to his father as delegate chief rabbi. He broke a lance in defence of Judaism with Professors Goldwin Smith and Max Müller, and upheld the Pentateuch against the criticisms of Bishop Colenso. In addition to his more controversial works he pub. (1864) *Ibn Gabirol, the Poet-Philosopher*.

Adler, Nathan Marcus (1803-90), chief rabbi of the Jews of the Brit. Empire, b. at Hanover, educated at Göttingen, Erlangen, and Würzburg. He was chief rabbi at Oldenburg, 1829, at Hanover, 1830, and appointed to the chief rabbinate in London, 1844, in which capacity he did much to reunite the various Jewish congregations. Pub. sermons and other works, including one on the Pentateuch.

Ad libitum (or *ad lib.*, at discretion, at pleasure), in music, denotes that the part so marked need not necessarily be played strictly to time, but that the performer may pause, or introduce any cadenza or addition of his own. An accompaniment is said to be *A. l.* when it is not essential, and may be either played or omitted.

Adlington, William (fl. 16th century), Eng. author, known for his *Golden Asse of Lucius Apuleius* (1566). A. as a translator ranks with John Florio, or Philemon Holland; yet nothing is known of him. Inasmuch as he dedicated his work to the Earl of Sussex from Univ. College, Oxford, in 1566, it

is evident that he was at Oxford, probably in a tutorial capacity. It is said by some that he was the 'W. A.' who in 1579 pub. a verse tract, *A Speciall Remedy against the Furious Force of Lawlesse Love*. (Consult Charles Whibley's introduction to the 1893 ed. of *The Golden Asse*.)

Administration. Of the two functions of gov., legislation and A., the latter is by far the larger and more important, and in recognition of this fact the Gov. of a country is often termed the A. or ministry. In modern constitutional states this A. must be in accordance with the law, and in this country, in addition to being responsible to the legislature, the ministers are as liable as ordinary persons for maladministration.

Administrative Counties are those cos. or parts of cos., including the co. of London and the co. bors., which, under the Local Gov. Acts, 1888-1933, form separate A. C. of themselves for the purpose of managing, through co. councils, the administrative business of their respective areas. Yorkshire has 4 administrative headquarters (excluding co. bors.), and Lincolnshire, Suffolk, and Sussex 2 each.

Administrator, a person appointed by authority to dispose of or administer the estate of an intestate deceased, or of a deceased who has made a will but named no executor, or if an executor dies before the distribution of the property. Such a person is now appointed by the probate division of the High Court, but prior to the creation of this court in 1858 an A. was appointed by the bishop of the diocese. Letters of administration are generally granted by the court to the next of kin, or in default a creditor may obtain them. An A. can charge upon the estate he administers his actual expenses but no more, and he is usually required to give some guarantee for faithful and competent administration. In all the Eng.-speaking provs. of Canada, the A. is allowed a commission—usually 5%—on the amount of money passing through his hands. Letters of administration must be applied for within 6 months of the death of the deceased, and a person performing the functions without this licence may be mulcted in £100 fine, plus an additional fine equal to 10 per cent of the value of the estate. The essential difference between an executor and an A. is that the latter can do nothing without the assent of the court appointing him.

Admiral, the title of the chief naval officers and the equivalent in rank in the marine forces to a general on land; in fact, the 4 classes of A.s. (As. of the Fleet, A., vice-As., and rear-As.) are equal in precedence with the 4 divs. of generals (field marshal, general, lieutenant-general, and major-general). The word is derived from the Arabic *amir* or *emir*, meaning a 'lord' or 'commander' (cf. *amir-al-bahr*, commander of the sea), and found its way into European tongues, like many others of E. origin, during the holy wars of the twelfth and thirteenth



centuries. The office is, however, considerably older, and before the word became used in this country under Edward III., the chief naval officer was known as the 'guardian of the sea' (*custos maris*). The early Eng. form of the word was *amiral* or *ammiral*, the latter form being used by Milton, Cromwell's secretary of state. The present spelling of the word probably arose from the belief that it was an abridged form of *admirable*, or that it was a compound with the Lat. *ad*. The office of Lord High A., which subsisted with breaks from 1405, when it was created by Henry IV., till 1828, when its administrative functions were vested in the present Board of Admiralty, was of great importance and carried with it certain judicial functions, which, since 1875, have been exercised by the Probate, Divorce, and Admiralty Division of the High Court (*q.v.*). The first Lord High A. was the Earl of Somerset, and from his time onward the duties were exercised by an individual until 1632, when for the first time the office was put into commission, all the great officers of state being commissioners. During the Commonwealth naval affairs were at first directed by a parl. committee, but afterwards Cromwell himself took control of them. When Charles II. was restored he appointed his brother James to be Lord High A., which office he retained till 1683, when Charles himself assumed it. On James's accession to the throne the next year he resumed his former office, but at the revolution of 1688 the office was again put into commission, in which position it has remained till this day if we except the 3 years 1707-9, and the 16 months (1827-28) when the 'sailor prince,' afterwards William IV., was Lord High A. Eng. As. are divided into the classes above mentioned. Formerly the As. of all grades were subdivided into As. of the Red, of the White, and of the Blue Fleet, but this is now abolished, as is also, owing to the entire structural alteration in the form of war-vessels, the old practice of an A. flying his ensign at the main, the vice-A. at the fore, and the rear-A. at the mizzen masthead. There are at present about 110 As. on active service. In the U.S.A. there are, at present, 2 grades—A. and rear-A.—estab. respectively in 1866 and 1862. The grade of vice-A. was estab. in 1864, but was allowed to lapse in 1890. Captain Farragut (*q.v.*) was the first to hold each of these ranks, which indeed were created in turn by Congress in his honour. The grade of A. was allowed to lapse on the death of Farragut's successor in 1891, but was re-estab. in 1899 in favour of Commodore Dewey (*q.v.*). Officials of the navy dept. hold, during the term of their office, the rank of rear-A.

'Admiral Graf Spee,' Ger. 10,000-ton pocket battleship, which was fought and chased in Dec. 1939 by a Brit. cruiser squadron into Montevideo and, on emerging again, was scuttled. A sister ship of the *Deutschland* and *Admiral*

*Scheer*, the *A. G. S.* carried 6 11-in. guns and 8 5.9-in. guns, besides anti-aircraft armament, and had a speed of 26 knots. Her armament was superior to the combined power of the 3 attacking Brit. cruisers, *Exeter* (6 8-in. guns), *Achilles* (New Zealand) and *Ajax* (each 8 6-in. guns), and her combined broadside was 4708 lb., as against a combined broadside of 3136 lb. of the 3 cruisers. Against their more heavily armed adversary the Brit. cruisers achieved their victory by superior speed and manoeuvrability and, by making ample use of smoke screens, which confused the enemy's aim, were able to approach near enough to the Ger. ship to bring her within range of their guns. The *Exeter*, after suffering a number of hits, had to drop out of the battle, while the 2 other cruisers continued the pursuit until the battleship took refuge in Uruguayan territorial waters. The *A. G. S.*, which had been acting in the Atlantic Ocean as a commerce raider since the war began, had on board 62 survivors of 9 Brit. merchantships which had been sunk by her previously. These survivors were released after the *A. G. S.* had put into Montevideo. The Uruguayan Gov., conformably to international convention, allowed the *A. G. S.* 72 hrs., expiring on the night of Dec. 16, in which to effect such repairs as were necessary to render her seaworthy again, after which she could either put to sea or be interned. Capt. Hans Langsdorff, commander of the *A. G. S.*, here attributed his defeat to the rapidity of manoeuvre of the Brit. cruisers, the great accuracy of their gunfire, and to the 'inconceivable audacity' of the *Achilles* and *Ajax*, who, though outgunned, twice dashed through the *A. G. S.*'s smoke-screen and poured shells into her from a range of less than a m. The *A. G. S.* put out to sea again at 6.30 p.m. on Dec. 17, shortly before the expiration of her time limit. 700 of her crew and most of her stores had been transferred to the Ger. cargo-boat *Tacoma*, which was later interned. Seventy min. later she blew herself up and sank 5 m. outside Montevideo harbour in the fairway used by shipping in the estuary of the L. Plate. Capt. Langsdorff and the remainder of the crew left the ship in boats before destroying her. The officers and crew, numbering 1039 men, landed at Buenos Aires, where they were interned by the Argentine Gov. Capt. Langsdorff committed suicide, an inglorious end to an inglorious fight. The *Exeter*, which led the attack and suffered a loss of 64 killed and 21 wounded, had fought on until only 1 8-in. gun remained in action, and that could only be fired by hand. The casualties of the *Ajax* were 7 dead and 5 wounded. The commander of the Brit. squadron, Commodore Harwood, was knighted and promoted to rear-admiral. An Uruguayan business man bought the wreckage of the *A. G. S.* for £1000. See also NAVAL OPERATIONS IN SECOND WORLD WAR.

Admiralty, the name given to the gov. dept. administering the Brit. Navy.

Formerly responsibility for maritime affairs was entrusted to the Lord High Admiral, one of the great officers of state; but to-day his functions are discharged by 'Commissioners for executing the office of Lord High Admiral,' commonly called the Lords Commissioners of the Admiralty. The growth in importance of the A. as a military arm has been accompanied by a shedding of other of its functions and some of its privileges. Thus its judicial function, except in matters of naval discipline, has been transferred to other courts, notably the Probate, Divorce, and A. Court (*q.v.*), while the A. Droits (*q.v.*) are now collected by the Board of Trade and their proceeds paid into the public exchequer. The office of Admiral of England, with its variant terms Lord Admiral, High Admiral and Lord High Admiral, dates certainly from 1360, but its origins are earlier. The office was first placed in commission in 1628 upon the assassination of the Duke of Buckingham. The executive authority remained with the political Lords Commissioners, but the administrative work was transacted by a subordinate board of technical officials called the Navy Board, consisting of the prin. officers of the Navy. The Navy Board had been constituted by Henry VIII. in 1546 from existing officials whose origin developed out of the office of keeper of the king's ships, first created by King John on the appointment of William of Wrotham, arch-deacon of Taunton, in 1214. Samuel Pepys was one of the principal officers of the Navy from 1660 to 1673, holding the office of clerk of the acts, and wrote his famous diary in the old Navy Office.

The A., sometimes in commission, and at times held even by the king himself, had no permanent quarters till the reign of William III., when Walkinford House, the old residence of the Duke of Buckingham in Whitehall, was rebuilt and occupied in 1695. The office was again rebuilt 1723-25, from designs by Thomas Ripley; and the screen erected in 1760 from designs by Robert Adam. The old board room contains some fine carving, and sev. historic items. With the expansion of business, a separate residence was erected, 1786-91, for the First Lord, adjoining the A. office. Reorganisation in 1832 abolished the Navy Board, which since 1786 had occupied Somerset House; and in 1869-73 the staff there was transferred to Spring Gardens till an extension of the A. buildings should be built. The new building (erected 1891-1906) was extended in 1910 by the erection of the memorial arch across the Mall, which commemorates Queen Victoria. In the archway block is the residence of the First Sea Lord. On the new buildings is erected the A. wireless station, by means of which direct communication with war vessels is maintained with headquarters. A large fortress-like bomb-proof extension was built during the Second World War as alternative accommodation for head-

quarters staff and for communications. The last Lord High Admiral, 1827-28, was the Duke of Clarence, who afterwards became William IV. The members of the Board of A. are denominated lords commissioners. Formerly the whole board changed with the gov., but normally only the political members change nowadays. The board is appointed by royal letters patent, and any change necessitates the issue of a fresh patent. The number of commissioners has varied with the amount of business, having reached 12 in 1918. To-day there are 8; their titles and present duties are as follows: 1st, FIRST LORD OF THE A., who is a member of the Cabinet and a Privy Councillor, and resigns when the Gov. does; he presides over the deliberations of the board and has the general direction and supervision of all business relating to the Navy, controls all appointments to the higher posts, and at board meetings he has the casting vote. Personal responsibility for operations of war falls on the shoulders of the First Sea Lord, because *ex officio* he is also the chief naval adviser to the Gov. 2nd, FIRST SEA LORD AND CHIEF OF NAVAL STAFF, is an officer of the R.N. and deals with questions of naval policy and maritime warfare, is responsible for efficiency of the Fleet, and controls the work of the naval staff. 3rd, SECOND SEA LORD AND CHIEF OF NAVAL PERSONNEL, is an officer of the R.N. and is responsible for the manning of the Fleet, mobilisation, and medical arrangements and discipline. 4th, THIRD SEA LORD AND CONTROLLER, is an officer of the R.N. and is responsible for the provision of all kinds of material, including ships, machinery, guns, ordnance and stores, controls design, manufacture and maintenance, inventions, and research. 5th, FOURTH SEA LORD AND CHIEF OF SUPPLIES AND TRANSPORT, is an officer of the R.N. and is responsible for coaling, victualling, transport, pay and allowances, clothing, and medals. 6th, DEPUTY CHIEF OF NAVAL STAFF, is an officer of the R.N. and is responsible for the collection of intelligence, co-operation with aircraft, land and wireless telegraphy; deals with questions of maritime international law. 7th, PARLIAMENTARY AND FINANCIAL SECRETARY (political; first included in the patent in 1929), is a M.P. and resigns his appointment when the Gov. does; is in charge of all questions concerning finance, expenditure, estimates, accounts, and contracts. 8th, CIVIL LORD (also political), is a M.P. and resigns when the Gov. does; he superintends all works services, general labour questions, and schools. If the Civil Lord is a member of the House of Lords he deals with all A. questions in that House. The PERMANENT SECRETARY of the A. is a not a lord commissioner of the A. He is a member of the civil service, is in charge of the secretariat, has financial control of the A., is accounting officer for navy votes, and is responsible for A. procedure, organisation, and discipline of the civil branches of the A. (Samuel Pepys,

as stated above, held a similar post in the old Navy Office in 1660.) The coast-guard service, which was formerly under the admiral - superintendent of naval services—called in more modern days 'Admiral Commanding Coast Guard and Reserves'—came to the A. in 1858 and, in 1923, was transferred to the Board of Trade. The older part of the A. contains some fine mahogany panelling and marine paintings by eminent artists. In the Ger. blitz on London the A. sustained 3 direct hits on the night of Apr. 16, 1941, which damaged the fine old board room, and cut a great slice out of the S. front facing the Horse Guards Parade. The most serious consequence was the interruption of communications by the flooding of the basement. Hence was built the fortress-like extension at the corner of the Mall and St. James's Park, a building which has the appearance of some oriental mud fort or citadel. Inside, air-conditioned and lit by daylight lamps, is accommodation for the board and for every one who might be needed for the world-wide control of the Brit. fleets under continuous attack in London. During the war naval ratings there ran a score of lines of air & high-speed transmission to naval wireless stations all over the world. There were also 80 girls in this fort working teleprinters to all the naval headquarters in Britain and the Continent. The complexity of modern warfare is truly reflected in the naval communication system, and this citadel is veritably a maze of machinery and conveyor belts. For details of U.S.A. see NAVY, DEPARTMENT OF THE U.S.A.

**Admiralty Court.** The function of this court, formerly exercised by the Lord High Admiral, or by a judge holding a patent from him, is to try and to give judgment in maritime causes. Since the Judicature Acts of 1873 and 1875, which estab. the Probate, Divorce, and A. Division of the High Court, these functions have been discharged by 2 judges, who, in addition to giving judgment in probate and divorce matters, exercise the jurisdiction of the old A. C. Its duties are twofold, as an instance court and as a prize court, functions which in former days were discharged by 2 separate courts, albeit the judge of the instance court was usually appointed to preside over the prize court. In its capacity as a prize court the court has jurisdiction in matters of capture in port or on land if the capture has been effected by a naval force, or a mixed naval and military force. The court can also try any questions referred to it by the Privy Council concerning booty of war, i.e. property captured by land forces. As an instance court it originally dealt with both criminal and civil causes, but a series of statutes transferring the criminal side of its work to other courts has rendered this branch of its jurisdiction practically obsolete. When the Central Criminal Court was estab. in 1838, A. criminal causes were transferred to it, and the A. Offences Act, 1844, provided that in cases where A.

jurisdiction would have applied, they should be treated as if they were offences committed in the country where the offender was apprehended. The Naval Discipline Act, 1866, transferred to naval courts-martial the authority hitherto possessed by the A. C. in the matter of discipline in the Navy. In civil cases again part of the work of the A. C. has been entrusted to the co. courts. The more important questions that the A. C. has to decide comprise those arising from disputes between part-owners of vessels, suits by seamen for wages, where not within the jurisdiction of other courts, cases of salvage, including A. Droits (q.v.), and actions for damages arising out of collision of ships, etc. There is a separate A. C. for Ireland, but matters of prize are vested in the Eng. court. The court of A. for Scotland was abolished in 1831, and its jurisdiction transferred to the ordinary courts—session, justiciary, and sheriff—and the maritime law of Scotland is the same as that of England. Courts of vice-A. exist in many Brit. colonies. Appeals from the A. C. lie to the House of Lords, and from vice-A. Cs. to the judicial committee of the Privy Council.

**U.S.A.**—By the U.S. constitution, as interpreted by the U.S. Supreme Court, A. jurisdiction extends not only to the high seas but to the great lakes and rivers, connecting them and to all public navigable waters in the U.S.A. The States long ago delegated the jurisdiction of their old vice-A. Cs. to the Federal Gov. This jurisdiction comprises all maritime contracts, torts, injuries, or offences. The Supreme Court has no original jurisdiction in A. cases, all suits being in the first instance brought in the U.S. dist. courts. An appeal both on law and fact lies from the latter courts to the circuit court of appeals, and this appeal is final except in cases touching the jurisdiction of the court, the construction of a treaty, cases of prize, the constitutionality of a State or Federal law, and cases of infamous crime, when the right of appeal is direct to the Supreme Court. The A. Cs. have jurisdiction also in cases of piracy and collision and over crimes and offences committed upon the sea within the administration and maritime jurisdiction of the U.S.A.

**Admiralty, Droits of.** These are certain perquisites that formerly appertained to the Lord High Admiral, chief among them being the right to property of an enemy seized at the beginning of a war, and derelict ships at sea. In the case of the latter the finders of the abandoned vessel were entitled to nine-tenths of its value, the A. D. being the remainder.

**Admiralty Island,** a large is. off Alaska, about 80 m. long, well wooded; discovered by Adm. George Vancouver about 1793.

**Admiralty Islands,** in the Pacific Ocean, form part of the Bismarck Archipelago. The largest is about 50 m. long. Discovered by the Dutch in 1616, they came under Ger. protection in 1885. They were

occupied by the Australian forces in 1914 and after the First World War were placed under Australian mandate. Seized by the Jap. in the Second World War, they were recaptured by the Allies in Mar. 1941. Pop. 15,000.

**Adobe**, a Sp. term for sun-dried bricks made from any substance which hardens in the sun; also used of the buildings made with the bricks. They are manufactured largely in Peru, and also in Egypt, Asia, and N. America.

**Adolphus**, John (1768-1845), an Eng. lawyer and writer of Ger. extraction. His chief success as a lawyer was in his defence of Thistlewood, the Cato Street conspirator, in 1820. He pub. a *History of England from the Accession of George III. to the Conclusion of Peace in 1783* (1802), also a *History of France from the year 1790 to the Peace at Amiens in 1802* (1803). See *Recollections of the late J. Adolphus*, by his daughter, Emily Henderson, 1871.

**Adolphus**, John **Leycester** (1795-1862), lawyer and writer, son of John A. (q.v.), called to the bar in 1822, and judge of Marylebone Co. Court, 1852. His *Letters to Richard Heber, Esq.*, pub. anonymously in 1821, demonstrated that Sir Walter Scott was the author of the *Waverley Novels*; the *Letters from Spain in 1836 and 1837* appeared in 1838. At the time of his death he was engaged in the completion of his father's *History of England*. See J. G. Lockhart's *Life of Sir Walter Scott*, 1837.

**Adonai**, a Heb. word for the Supreme Being. The singular form is Adon, meaning lord, and the final *i* is the possessive 'my.' The Jews pronounced JHVH Adonai, and from the consonants Jhvh and the vowels of Adonai the name Jehovah has arisen.

**Adoni**, a tn. in the Bellary dist., Madras, formerly a stronghold of the Vijayanagar kings. It manufs. cotton very largely, especially cotton carpets. Pop. 31,600.

**Adonis**, a mythological Gk. hunter, son of Cinyras and Myrrha, beloved of Aphrodite. He was slain by a boar, and descended to the lower world; Aphrodite sprinkled nectar on his blood and from it sprang the anemone. Persephone refused to give him up to Aphrodite, and Zeus settled the dispute by allowing him to spend one-third of the year with each goddess in turn, while one-third belonged to himself. He is represented as the type of masculine beauty, and as such appears in poetry. See Ovid's *Metamorphoses*, x. 298-739; also Shakespeare's *Venus and Adonis*.

**Adonis**, in botany, is a genus of plants belonging to the Ranunculaceae, found in Europe and N. America. The *A. vernalis* is a spring flower of a brilliant yellow; *A. autumnalis*, or pheasant's-eye, is found in wheat-fields in the autumn; *Flos A.* has scarlet petals fancifully connected with the blood of the mythological hero.

**Adoptionism**, an heretical doctrine which originated in Spain at the end of the eighth century. Elipandus, arch-

bishop of Toledo, and Felix, bishop of Urgel, declared that Christ in His divine nature was the Son of God by nature and generation, in His human nature He was the Son of God by adoption and grace. Charlemagne condemned the 2 bishops at the synods of Ratisbon in 792 and Frankfort in 794; Felix recanted, but Elipandus adhered to his views. See C. W. F. Walch, *Historia Adoptionum*, 1755; A. Harnack, *Grundriss der Dogmengeschichte*, 1889; R. L. Ottley, *Doctrine of the Incarnation*, 1896.

**Adoption** is a custom widely prevalent and legally regularised in many countries, both anct. and modern, though until recent legislation it had no place in Eng. law. Broadly, the term is used for the act of taking a person into a family with the intention of conferring on that person the rights and duties of his new family. The theory of A. is generally traced to 2 motives: first, the desire to increase the strength of the family or clan, and second, to ensure, as in anct. Athens and modern India, the performance of sacred funeral rites. It follows naturally that where parental rights are strong, A. assumes its greatest importance, and in anct. Rome, where the relationship of father and son was akin to that of master and slave, the law of A. played an important part. There were 2 forms of A. in Rome: one, by a fictitious or formal sale of the child by its natural parent before a magistrate, and two, by abrogation, i.e. by a vote of the people in the *comitia curiata*, or, at a later period, by imperial rescript. In the case of abrogation it was necessary for the person adopted to be *sui generis* (his own master). A woman, having no parental power (*patria potestas*) over her own children could not adopt a child. Considerable changes were introduced by the *Institutes* of Justinian, chief among them being that parental authority did not pass to the adoptive father.

Previous to the Act of 1926, A. in the United Kingdom was no more than voluntary guardianship. Under that Act, the proposed adoptive parent must not be under 25 years of age and must obtain the sanction of a court to the A. When legal sanction has been given, the natural parent loses all rights in the person adopted and the adoptive parent takes his place in all respects. The Adoption of Children (Regulation) Act, 1939, was aimed at abuses in connection with the informal A. of children; made it necessary that A. societies be registered with the local authority; and imposed restrictions on A. abroad.

**Adour**, called by Rom. writers *Atur*, *Aturis*, and *Aturus*, is a riv. of France which rises in the Pyrenees, and after a course of 200 m. flows into the bay of Biscay. On its banks are Bagnères-de-Bigorre, Tarbes, Aire, St. Sever, Dax, and Bayonne, and some of its affluents are the Gabas, Luy de Franco, Luy de Béarn, Gave de l'Au, and the Bidouze on the left; the Midouze on the right.

**Adowa** or **Adua**, the cap. of Tigré,

**Abyssinia**, is a well-built tn. 6000 ft. above sea-level with a pleasant climate. The Abyssinians here severely defeated the Its. under Gen. Baratieri on Mar. 1, 1896. In Oct. 1935, the Its. launched an air attack on A., and the tn. surrendered after a few days. Pop. 5000.

**Adoxa Moschatellina**, the moschatel, is a spring flower with a small like that of musk. Belongs to the order of Ivy-worts. A. M., the Brit. species, is small in its inflorescence and is found in moist, shady places.

**Adra**, a tn. of Andalusia, Spain, near which is anct. Abdera, founded by the Phenicians. The chief occupation is lead-mining. Pop. 4800.

**Adrar** (Berber for highlands), an oasis of the Sahara, with Wadan for cap. Its products are dates, grain, melons, and salt. Pop. 7000.

**Adrar**, Sp. N. Africa, see RIO DE ORO AND ADRAR.

**Adrastus**, king of Argos, a legendary Gk. hero, waged war on behalf of Polyneices, his expedition being known as the Seven against Thebes. A. alone escaped alive. The Epigoni, or descendants, later destroyed Thebes, and the son of A. alone fell. A. d. of grief for the death of his son. See Herodotus, i. 41-45; 67-68.

**Adrenalin** ( $C_9H_{17}O_3N$ ), a compound prepared from the suprarenal capsules of the horse and other animals. It is used in medicine to arrest hemorrhage, and in the treatment of Addison's disease.

**Adria** (anct. Hadria, Hatria, or Atria), once a seaport of the Adriatic, is now 14 m. inland in Rovigo, Italy, near the Po and the Adige. The remains of the old city are buried near the present one. It is the seat of a bishopric. The exports are cattle, grain, silk, flax, leather, and pottery. Pop. 31,000.

**Adrian**, see HADRIANUS.

**Adrian**, the name of 6 popes.

**Adrian I.** was pope from 772 to 795. He received aid from Charlemagne during an invasion of his realms by the Lombards. Some dispute arose concerning image-worship, without, however, disturbing the friendliness of the Frankish alliance. He d. before the dispute was settled.

**Adrian II.**, pope from 867 to 872. During his occupation of the papal chair trouble arose over the subject of his power over Bulgarian converts. He was compelled to submit.

**Adrian III.**, who was pope from 884 to 885, was succeeded by

**Adrian IV.**, the only Englishman to enjoy papal control. His name was Nicholas Breakspear, and he was b. about 1100 at Langley in Hertfordshire. His father was a priest of Bath, who abandoned his son, entering a monastery. Nicholas went to Paris and became a monk at St. Rufus near Arles. In 1137 he was elected abbot. He was summoned to appear before the pope at Rome as a result of a conspiracy to overthrow him, because of a strongly developed disciplinarian attitude towards his monks. At the inquiry he distinguished himself by his successful

defence, and moreover won approval from the pope. In 1146 he was appointed cardinal-bishop, and in 1154 was elevated to the papal chair. He d. in 1159, after causing a long contest between the popes and the house of Hohenstaufen, which dynasty was finally overthrown long after A.'s death.

**Adrian V.** became pope in 1276 and d. in the same year.

**Adrian VI.** was pope from 1522 to 1523. His administration was actuated by a desire to sweep away all existing abuses, but met with much opposition.

**Adrian**, a tn. in Michigan, U.S.A., 211 m. E. of Chicago, with a college and an industrial home, railway shops, and manufs. Pop. 13,000.

**Adrian de Castello** (c. 1460-c. 1521), It. scholar, statesman, and ecclesiastic, was b. of humble parents in Tuscany. As servant of Pope Innocent VIII. he was sent to England in 1488, and became Henry VII.'s agent at Rome. In 1502 he was appointed bishop of Hereford, in 1503 Pope Alexander VI. created him cardinal, and in 1504 he became bishop of Bath and Wells. In 1517 he was accused of being accessory to the plot to poison Pope Leo X. and stripped of all his offices in 1518, Cardinal Wolsey being his successor at Bath. He fled to Venice, and is thought to have been murdered on his return journey to Rome when Leo X. d. His writings consist of a poem entitled *Venatio*, 1505, and 2 treatises.

**Adrian, Edgar Douglas** (b. 1889), Eng. physiologist; educated at Westminster School and Trinity College, Cambridge Univ. Appointed prof. of physiology, Cambridge Univ., 1937. Fellow of Trinity College, Cambridge. Oliver Sharpey lecturer, Royal College of Physicians, 1925. Foulerton Research prof. of the Royal Society, 1929-37. Pub.: *The Basis of Sensation*, 1918; *The Mechanism of Nervous Action*, 1932; papers on the physiology of the nervous system in *Journal of Physiology*, *Brain*, etc. Jointly awarded Nobel prize for medicine, 1932. Appointed to Order of Merit, 1942.

**Adrian's Wall**, see ROMAN REMAINS.

**Adrianople**, see EDIRNE.

**Adriatic Question**, The. The question of the control of the Adriatic, involving, more or less, all the 4 littoral States, Italy, Yugoslavia, Albania, and Greece. The question of the control of the Dalmatian coast of the Adriatic, apart from the necessity for securing her N. frontier, was that which primarily determined Italy's policy towards the belligerents in the First World War. The whole future development of the country was involved in the solution of the problem of Italia Irredenta, and Italy's participation in the conflict was to be obtained only on consideration that an appreciable guarantee was afforded of redeeming peoples traditionally regarded as It. in sympathy and blood. In 1915 Italy signed with Great Britain and France the secret pact of London, by which it was agreed to give to Italy Trieste, Pola, and part of

**Dalmatia.** The negotiations were necessarily of a delicate nature, for opposition was to be expected from the Slavs and, through them, Russia. It is not surprising in all the circumstances that the price demanded by Italy for her active intervention on the side of the Entente met with a formal protest from the Serbs against any such concession being made. The Adriatic littoral is almost exclusively populated by the Croats and Serbs, and the fact that the principle of the liberation and unification of the nations—one of the predominant factors in the European crisis of 1914—and in particular the Slav nation, would be violated by any such arrangement, was of itself enough to enlist against Italy the sympathies of the Russian Gov. It may be assumed that the prevailing opinion in Russia, while against the cession of the Dalmatian coast, was still more averse from any action which would result in a new Macedonian problem. It was pointed out in Russian political circles that the immediate origin of the Macedonian problem was the treaty of Bucharest (1913), which destroyed the Balkan Alliance and in a sense led indirectly to the First World War. A similar state of things was being created by the conclusion of the It. agreement, but in the result the Croatian and Slav claims were ignored and the alliance of Italy was purchased at the price asked by that power.

(See also Fiume: LONDON, FACT OF; TRIPLE ALLIANCE.)

**The Adriatic Considered Strategically.** An examination of the strategic position in the Adriatic as in the early months of 1916 will readily show why Italy failed to save Montenegro, and it will likewise explain why Italy deemed it prudent to occupy Valona in the very early stages of the war and long before the Ger. armies entered the Balkans. Italy's E. shore possesses no harbours suitable as naval bases for a modern squadron (except Taranto, which is outside the Adriatic). The opposite coast contains many of the finest natural harbours in the world, like Pola, Sebenico, Cattaro, Durazzo, Trieste—flanked for the most part with an amphitheatre of hills, capacious enough to accommodate a large fleet, and the whole Dalmatian coast is thickly studded with sheltering is. Cetinje was therefore deemed almost from the commencement, for it lies at no appreciable distance from Cattaro. Durazzo, though seized by the Its., had to be given up as Austrian power spread southward. For the previous 40 years and more Italy's position in the Adriatic had always been precarious from a strategic standpoint; and this danger became accentuated when Austria took possession of Bosnia and Herzegovina. It was therefore hardly from imperialistic motives that the Its. then coveted Adriatic control, or a greater measure of control. The intolerable character of the position had given rise to one of the fundamental doctrines of modern It. statesmanship, and leading It. politicians consistently

held that until the equilibrium of the Adriatic—which in old It. documents is significantly spoken of as *il golfo di Venezia* and by masses of its people to-day as *il mare nostro*—could be restored, Italy would never be in a position of adequate security to act from the point of view of national independence. This doctrine unquestionably influenced It. statesmen at the time of Italy's intervention in the First World War, and throughout it lent to It. action much of its initiative, enthusiasm, and driving force. In 1939 Mussolini, by seizing Albania, secured virtually absolute control of the Adriatic. In the Second World War It. control was first weakened by the torpedoing of half the It. battle fleet at Taranto (Nov. 11, 1940) by the R.A.F. and by the Brit. naval victory off Cape Matapan (Mar. 28, 1941). Later, the successful operations of Marshal Tito in Yugoslavia further jeopardised It. control, which was lost entirely when the Anglo-Amer. armies invaded Italy. In any case the phenomenal development of aircraft rendered the strategic control of the Adriatic impossible without control of the air.

**Adriatic Sea, or Gulf of Venice,** is a large arm of the Mediterranean into which the Po and Adige empty themselves. It is about 500 m. long, and its average breadth is 100 m.; the water is very salt. In summer navigation is safe, but the S.E. winds make sailing dangerous in winter. It probably derives its name from the ant. city of Adria. See C. Yrlande's *Les Bords de l'Adriatique et le Monténégro*, 1878; G. L. Faber's *The Fisheries of the Adriatic and the Fish thereof*, 1883; F. H. Jackson's *Shores of the Adriatic*, 1908; R. W. Seton-Watson's *The Balkans, Italy, and the Adriatic*, 1916.

**Adua, see ADOWA.**

**Adula, the ant. name of Zulla or Thulla, on the coast of Abyssinia, near Annosley Bay.** It is interesting as the locality in which Cosmas, a Christian merchant, discovered the Gk. inscription known as the *Monumentum Adulitanum*—really 2 inscriptions united, one referring to Ptolemy Euergetes (247–222 B.C.), the other to an unknown Ethiopian king. It also describes the subjugation of the Abyssinians. See H. F. Clinton's *Fasti Hellenici*, part ii, 1824.

**Adullamites, a political term applied to the Liberals who voted against Gladstone's Reform Bill of 1866.** Bright compared the seceders to the fugitives who hid with David in the cave of Adullam (1 Sam. xxii.); Lord Eloho spoke of Gladstone as Saml and Bright as the armour-bearer. The Cave is another name of the group.

**Adult Education.** The Board of Education, in Apr. 1921, appointed a committee to promote the development of liberal education for adults, and, in particular, to bring together national organisations concerned in A. E., so as to secure mutual help and co-ordination. A. E. regulations were pub. by the board in 1921. In the ensuing 6 years the

more elementary and pioneer forms of A. E. came into prominence, with such names as preparatory classes, one-year courses, and terminal courses (all these being under the board's A. E. regulations), and evening classes for adults, study circles, and a multitude of other titles (these, not being organised so as to conform with the regulations, having a free choice of title). The growth of this type of work creates, in a sense, a new position in A. E.; it is a source of great satisfaction to those whose chief desire is the spread of education, but a source of some anxiety to those who see in it a danger of confusion of aims between different kinds of A. E. and of a decline in standard.

The position at the outbreak of the First World War was that the term adult education was commonly used to denote the activities of the Univ. Extension movement and the Workers' Educational Association; and that many other bodies and institutions which, in furtherance of religious or social aims, had, for many years past, undertaken educational work among adults, were examining the methods adopted by the Workers' Educational Association in conjunction with the univs., and were co-operating in certain areas with the association in the formation of classes. But the movement was still in an early stage of development, and the term adult education was not familiar to the man in the street.

In the session 1919-20, univ. tutorial classes in England and Wales numbered 226, or twice the number in 1913-14; in the session 1920-21, when this committee was first appointed, the number rose to 299. By 1921-22 the number was 353. But during the same period one-year courses had been growing yet more rapidly, numbering 329 in 1921-22, or 4 times the number in 1913-14. In 1923-24 the board undertook to include in their estimates a sum sufficient to provide for a 20 per cent increase in the number of classes, and the number rose to 393 univ. tutorial classes and 359 one-year classes. At this point new conditions were introduced.

The board then issued new regulations, and the number of classes at once showed a great increase. The maximum grant payable in respect of a univ. tutorial class was raised from £45 to £60, and in special circumstances £75. Univ. extension courses and preparatory classes, which had previously been aided under the regulations for technical schools at low rates, based on the number of students multiplied by the number of hours of attendance, were now brought under more rigorous standards of attendance and written work and were given a much higher grant. The chief distinction between preparatory classes and extension courses is that the former must give a suitable preparation for students intending to proceed to tutorial classes, while the latter are self-contained. Extension courses are usually organised in lecture periods, which may be attended by a general audience, followed by class

periods, attended by persons some of whom are willing to do written work. There are also grants in aid of terminal courses, which meet for not less than 1½ hours a week for 12 weeks, written work not being required, and of one-year courses meeting not less than 1½ hours a week for 20 weeks, written work being required.

In some areas authorities definitely assume financial responsibility for courses organised by voluntary bodies. Most authorities, however, are content to make a contribution in aid of courses organised by voluntary bodies. The majority of authorities are now interested in A. E. Certain organisations, such as the National Adult School Union and the Co-operative Union, which provide for A. E., do not seek public assistance, and prefer to pursue their aims and to organise their work free from any external control. There are many bodies with religious or social aims which promote some A. E. but cannot be said to have A. E. as their principal activity.

Univ. extension courses and univ. tutorial classes no longer exclusively represent A. E. in the eyes of the community; year by year they increase in numbers, but decrease in proportion to the whole. In 1913-14 univ. tutorial classes far outnumbered the other registered classes of the Workers' Educational Association. When account is taken of all classes for which local education authorities assume financial responsibility, it is clear that now classes of shorter duration far outnumber univ. tutorial classes.

The establishment by the London Co. Council of a number of literary institutes in 1919, after an interrupted period of experiment on a small scale, is one of the landmarks in the development of A. E. These institutes, some 10 in number, have about 5000 students enrolled in them, who are mostly men and women between the ages of 20 and 40, who have received a good elementary education followed often by some secondary or commercial education.

The courses recognised under the A. E. regulations include: Literature, Languages, Economics, Industrial Hist., Geography, Aesthetics, Music, Art, Natural Science, Biology, Sociology, Philosophy, Psychology, Mathematics. In the London literary institutes the subjects of study are differently distributed, Literature, Hist., and Aesthetics taking a much more prominent place. In the London men's institutes the curriculum is again of a very different character, handicrafts, hobbies, and physical exercises taking a prominent place.

Other associations engaged in A. E. besides those mentioned already in this article, include the British Institute of A. E. (29 Tavistock Square, London, W.C.1); Central Joint Advisory Committee on Tutorial Classes (38a St. George's Rd., Victoria, London S.W.1); Civil Service Council for Further Education (Parliament Mansions, Victoria St., Westminster, S.W.1); Delegacy for

Extra-mural Studies (Rewley House, Wellington Sq., Oxford); Educational Settlements Association (8 Endsleigh Gdns., London, W.C.1.); Joint Committee for Residential A. E. (8 Endsleigh Gdns.); National Adult School Union (30 Bloomsbury Street, London, W.C.1.); World Association for A. E. (16 Russell Square, London, W.C.1.); Y.M.C.A.; Y.W.C.A.

*A. E. in the U.S.A.* A. E. in the U.S.A. chiefly started during the middle decades of last century, in the evening schools founded by the Christian Churches and philanthropic persons. Presumably these were intended in the first place for children, and were somewhat similar in character to the Brit. Ragged Schools. In the course of time older scholars, anxious to improve themselves, took advantage of these institutions, and remained the only scholars after the children were nationally provided for. A stimulus was given to A. E. after the Slave war, through a public-spirited endeavour to deal with new problems. The desire of the Methodist Episcopal Church to improve the education of its Sunday school teachers, led to the formation of short settlements lasting a few days or weeks, during the summer. Very rapidly these summer schools developed in character and widened in the range and variety of subject-matter. The Chautauqua (*q.v.*) movement, as it is called, from the name of the first school, quickly spread through the U.S.A., and hundreds of summer schools came into existence, with aggregate scholars that are now numbered in millions. Very few of these are associated with the original Chautauqua school, and frequently they are financed by the tn. in which they are held, or by an interested committee. They are not run for profit, and are largely independent of each other or of any central body. The Young Men's and Young Women's Christian Associations of America have long made a special feature of A. E. in a great number of tns. and cities, carrying on work of a nature comparable to that of the London Polytechnic. In the great cities such bodies as the Pratt Institute, the Cooper Union, and the administrators of the Peabody and Slater funds still further assist A. E. Correspondence colleges probably exercise greater influence in America than in most other countries and perform especially useful service in remote and less populous districts.

**Adulteration** (Lat. *adullerare*, to defile or render impure), the act of mixing with a commodity some inferior stuff, or abstracting some material of value for the purpose of extra profit.

The practice of A. has been known from the earliest times. The merchants of the E. and of anc. Greece and Rome were in the habit of mixing inferior wines with good in order to enhance their own profit. Complaints are met with as early as the reign of King John of the roguery of brewers, bakers, and other tradesmen in England, and at the present time, despite all legislation, the A. of

various kinds of food-stuffs still exists. In earlier times the dishonest attempts of manufacturers were crude and fairly easy of detection, but in these days the adulterator has called chemical science to his aid, and so well is he able to counterfeited the genuine article that it is only by pitting against him the trained analyst that he can be brought to book. It is probable, fortunately, that the measures directed against A. are gradually taking effect, and, coupled with the greater desire of the consuming public for pure food, will do much to abolish a dangerous practice. It may at once be admitted that the fault is not all on the side of the vendor of the adulterated articles. His excuses are, no doubt, often specious, but the average customer demands an attractive appearance in the goods he buys, which can only be obtained by the addition of injurious matter. Preserved peas naturally lose their bright green colour, which, however, can be renewed by the addition of copper sulphate. Many people suppose that milk rich in cream has a yellowish tinge. Now pure milk is almost white, so that the milkman may colour his milk artificially to make it saleable. So much may be said for the difficulties of the tradesman, but when he protests that certain added materials are quite harmless, that they improve the flavour, or that the market price forbids a pure article, in the interests of the public health he should be repressed. Many adulterants may not be actively injurious and yet may do a great injustice to poor and ignorant people. They expect certain qualities in their food, and are defrauded if that standard is not reached. The practice of adulterating milk with water does not lead to poisoning, but it often means insufficient nourishment for the infants of poor parents.

Various Acts have been passed relating to the A. of food and drugs, the most important being those of 1875, 1887, and 1899. They provide that food and drugs must not be mixed, coloured, stained, or powdered with any material injurious to health. No person is liable to conviction if he can show that he did not know of the A., and that he could not by the exercise of reasonable diligence have ascertained the fact. No person may sell to the prejudice of the purchaser any article of food or any drug not of the nature, substance, or quality demanded. It is not, however, illegal to add any ingredient not injurious to health if required for the preparation of the food or drug as an article of commerce, provided the ingredient is not added fraudulently to increase the bulk or weight, or to conceal any inferiority in quality. Ingredients which are not of an injurious or a fraudulent character may also be added if the article is labelled to the effect that it is mixed. The penalties for infringement are limited to £50 for the first, and £100 for a subsequent offence. The Margarine Act of 1887 provides that all butter substitutes or mixtures of butter and substitutes are to be marked, when exposed for sale or



packed for storage or transport, with the word 'margarine' in large letters.

Many common food articles have been adulterated. For example, wheat flour can be adulterated with flour made from maize or rice, butter with margarine, milk with borax or soda as preservatives, jam with vegetable pulp, coffee with chicory, and cocoa with sago flour. Various Acts of Parliament have been passed to stop A., and inspectors are appointed by the co. and bor. councils to visit shops and examine the articles sold. An inspector can buy a sample of anything he thinks is adulterated and have it analysed. If the analyst finds it is adulterated the offender can be heavily fined.

All the states of the U.S.A. have passed laws for securing the purity and cleanliness of food. Most of these state laws adopt the general principles to be found in the Federal law as enacted in the Federal Food and Drugs Act, 1906, and amending Acts. This Act gives the Federal Gov. jurisdiction over all food intended for commerce, whether for foreign countries or as between state and state; but each of the states has control over all the food produced and consumed within its own border. The above Act provides that food shall be free from injurious ingredients, etc., and that packages shall clearly state the quantity of the contents. It also provides two remedies for infringement, namely criminal prosecution and seizure of the goods, and both may be exercised concurrently. The purity or freedom from adulterants of such important foods as meat and tea is safeguarded by special Acts, empowering inspection by the Federal authorities. Tea shipments for entry into the U.S.A. are inspected in order to secure that the tea as to quality conforms to the standard laid down by the secretary of agriculture; while under the Meat Inspection Act all animals intended for slaughter, all carcasses for food, and all meat for canning, curing, etc., are examined, the inspection thus beginning with the live animal and ending only when the finished product leaves for consignment, whether from state to state or to a foreign buyer.

Adultery means sexual intercourse contrary to the canon or civil law, and in auct. legal codes it was, in theory at any rate, harshly punished, in many cases the death penalty being prescribed. Some modern states still regard A. as a crime, and treat it as such, some of the states in the U.S.A., until recently, punishing it by fine or imprisonment. In England A. is subject to no penalty other than social ostracism, but is ground for a civil action for damages and for divorce. Formerly only the husband could petition for divorce on the sole ground of A., a wife's petition requiring some additional ground, such as desertion or cruelty, but since the passing of the Matrimonial Causes Act, 1923, both sexes are on an equal footing in this respect. A petitioner who also has committed A., must seek the court's discretion, whether his (or her) petition will fail. See further under DIVORCE.

Ad valorem (Lat., according to the value), a commercial term implying that calculations for stamp duty, etc., are made on the value of a bond or other article. In rules and orders fixing certain duties, A. r. duties, as opposed to specific duties, are those levied according to the value of the goods imported. A. v. stamp duties, e.g. in the case of a lease or a bill of exchange, are, under the Stamp Acts, payable according to the value of the subject-matter of the particular instrument.

Advancement, a legal term for money advanced to a minor or other beneficiary under a will or settlement with a view to the A. or benefit of that person. A common form of A. is that of finding the capital for setting a person up in business, but money expended on education or apprenticeship is not technically considered A.

Advent (Lat. *adventus*, the coming) is the season of 4 weeks preceding Christmas appointed in the Eng. and other Christian Churches for preparation for the festival of Christmas to celebrate the nativity or manifestation of Christ. In the same way Lent is the season of preparation for the festival of Easter, and formerly A. was kept almost as strictly as Lent, public amusements and festivities being prohibited, and fasts kept. The first Sunday in A., or A. Sunday, as it is commonly called, is the Sunday, whether before or after, which falls nearest to St. Andrew's Day (Nov. 30); and since the sixth century A. Sunday has been the commencement of the eccles. year, except in the Gk. Church, in which it begins on St. Martin's Day (Nov. 11). It was formerly the custom to regard the coming of Christ as fourfold: 1, at His nativity; 2, at the hour of death to receive His disciples; 3, at the fall of Jerusalem; 4, at the day of judgment. It is now usual to speak of His coming as twofold: His first coming at His nativity as the Saviour of the world, known as the 'first A.' and His second coming at the day of judgment, known as the 'Second A.' During the season of A. the lessons are chosen so as to exhort people to think of His second coming. In the Scriptures themselves the second coming of Christ is spoken of differently in different passages, and it has been a subject of much controversy amongst theologians as to its time and form.

Adventists (Lat. *adventus*, the coming), or Second A., is the collective name of 6 groups of religious sects in America: the Evangelical A., Advent Christians, Life and Advent Union, Age-to-Come A., Seventh-Day A., Church of God. They are Protestant sects, and all but the last 2 groups are congregational in gov. They had their origin in the agitation in 1831 of William Miller, who from his studies of the biblical prophecies deduced that the end of the world would come in 1843, and that Christ should then make His second appearance on earth. He soon gathered together a large following, who adored to him even after his prophecy failed; in 1844 they were

again disappointed in the millennium theory, but in 1845 they determined to look for the second coming of Christ at a near but indefinite date, and this is now the accepted belief.

*The Evangelical A.* (1845) believe in the resurrection of the soul, that the just will reign with Christ through the millennium, and the unjust shall be tortured in hell for ever. *The Advent Christians* (1861) hold that at the second coming the just will receive immortality, the unjust annihilation. *The Seventh-Day A.* (1845) is the largest group, holding the seventh day sacred as the Sabbath, believing in some mystic biblical prophecies, the triumph of the righteous and destruction of the unrighteous. *The Church of God* (1864-65) resembles the foregoing in all respects but in the application of the two-horned beast to the U.S.A., and in the acceptance of Mrs. Ellen J. White's writings as inspired. *The Life and Advent Union* (1860) believe that the wicked will remain asleep throughout eternity, while the good shall obtain everlasting life. *The Age-to-Come A.* (1831) maintain that eternal life is gained only through Christ. There are in the U.S.A. 30,000 church members of the Advent Christian Church and 120,000 members of the Seventh-Day A. See D. T. Taylor's *The Reign of Christ*, 1889; J. G. Wellcome's *History of the Second Advent Message*, 1874; Mrs. E. J. White's *Great Controversy*, 1870.

**Adventure Bay**, in Brunel Is., off the S.E. coast of Tasmania, was discovered by Captain Furneaux in 1773, and named after his ship, the *Adventure*, which was later used by Captain Cook on his visit to the bay in 1777. See Captain J. Cook's *Third Voyage*, vol. i., 1784; W. Bligh's *Voyage to the South Seas*, 1792.

**Adverb** (Lat. *adverbium*, from *ad* and *verbum*, word, verb) is the name of one of the parts of speech used with verbs, adjectives, or other As. to qualify their meaning, just as the adjective is used with substantives, e.g. in 'He sings well,' 'well' is the A. qualifying the verb 'sings'; and in 'An extremely delicate child,' 'extremely' is the A. qualifying the adjective 'delicate'.

**Advertisement.** The excavated ruins of lava-buried Pompeii and Herculaneum show that A. was employed in the time of the Cæsars. On the walls of what were presumably the most frequented thoroughfares were As. of various kinds of baths, announcements of gladiatorial shows, and notices of plays. In Rome at the same period a daily gazette called the *Acta Diurna* (q.v.) contained public notices and As., and among the Gks. a public crier was employed to announce the wares of the shopkeeper. The public crier, or bell-man, persisted through the Middle Ages, and is still to be found in small provincial towns. Nowadays public and official As. are made by posting them at church doors, as in the case of lists of parochial voters, or in the columns of the *London Gazette*, pub. by the Gov. twice weekly. Royal proclamations are made in this *Gazette*, and it is also the channel

by which announcements are made as to bankruptcies, Army commissions, Orders in Council, etc. Many other official announcements required to be made by statute or by an order of the court are pub. in the *Gazette*, e.g. notices by trustees; but as the *Gazette* has but a small circulation generally, an A. in it is not considered sufficient public notice of a dissolution of partnership. The popular supposition that an A. by a husband to tradesmen not to supply goods to his wife relieves him of his liability to meet their bills is erroneous; such intimation must be given to each individual tradesman. If in an A. for lost or stolen property the advertiser intimates that no questions will be asked as to how the person responding to the A. came by the missing property, then the advertiser commits a criminal offence, and is liable to a fine of £50, as are also the printer and publisher of such announcement. In some cases the publication of an A. is *ipso facto* considered as making a contract with the respondent to the A., as when a railway company or steamship line advertises for goods. Such advertisers are bound to accept the goods tendered for transport on the terms of A., provided, of course, in the case of the vessel, that it is not already booked up. An auction once begun and advertised as 'without reserve' must be proceeded with or a contract is broken.

Commercial advertising may be said to embrace 2 deplis.: A. by poster and otherwise in places of public resort, and A. in papers, books, and other reading matter. The first Eng. newspapers contained no As., but a journal pub. at the middle of the seventeenth century, the *Mercurius Politicus*, had small As. of the 'situations wanted' type. With the rise of newspaper advertising the character of the newspaper has undergone a profound change. The establishment of *The Times* in 1785 may be regarded as the commencement of the period of modern A. From 1712 to 1853 a varying revenue tax was imposed on As. The annual revenue derived from this was £170,000 in 1832, but the following year the duty was considerably reduced. Despite this the Treasury was receiving £180,000 when the duty was abolished. Among other forms of A. are those of hand-bills, sand-wichmen, illuminated sky-signs by night of various and varying colours, boards and metal sheets of all descriptions on rolling-stock, on railway stations, and at the railway and roadside. But most common of all forms of outdoor A. is the poster. Many of the posters of large firms contain pictures of high artistic merit. To the aid of A. have been called painters like Millais and Herkomer, black-and-white artists like John Hassall and Charles Harrison. One firm of soap merchants, Messrs. Pears, united the art of artist and poet in an A. which was the joint production of Walter Crane and Sir Theodore Martin. Advertising by poster and in newspapers continues to be developed to the utmost limits of ingenuity, and the literature on the art

grows correspondingly. Argument on the efficacy of the poster suggests that there is a danger of confusing its functions with those of the newspaper A. It is the function of the latter to attract attention and stimulate the wish to buy, whereas that of the poster is merely to act as a reminder, though it may indirectly lead to the desire to purchase. Changes in schools of painting, too, are reflected in the poster, though it is still maintained that the better the painter the better the poster. Some experts in advertising aver *e.g.* that Mauet and Bonnard were better poster artists than were Millais or Leighton, because they were better painters, but the point is obviously highly controversial. What seems clear is that the two arts are distinct, and that until the distinction is properly recognised, there will continue to be a compromise. The art of Brangwyn, as exemplified in railway company posters, offers, however, a high degree of symbolical skill and pictorial beauty which are not easily rivalled, lending, as they do, a genuine dignity to the subject with which the A. is associated. In recent years there has been a marked improvement in the use of boardings, though hostility has been aroused by a too liberal display of them to the detriment of rural beauty. The technique of poster design demands, according to some exponents, that the true individual note be sought and achieved at all costs, and that this is to be attained by avoiding as the main colour the colour which happens to be dominant at the time; and similarly, if much letterpress happens to be in vogue, this should be subordinated to concentration on pictorial work; while, again, if all advertisers of a particular thing, as *e.g.* sauce, favour a mammoth bottle, the individual note may be achieved by employing some other object altogether, provided it be striking and directly related to the subject advertised. It is probably becoming universally recognised that good taste in advertising pays. There is, at all events, a manifest striving after the ideal. A real or quasi-literary touch is given, *e.g.* to the numerous slogans which appear in public places, notably in the carriages of the London underground railways. Pictorial designs suggestive of vernal delights are introduced to attract the passenger to these railways, although at first sight he may not commonly associate such amenities with underground travel. Good slogans may well repay the ingenuity expended on them. Here again technique has evolved its principles. A good slogan should directly or by necessary inference apply to the article advertised, and not rely merely on the name being mentioned casually or in some other part of the A.; the slogan may be alliterative, but in any event should have a lilt or rhythm which compels recollection; and it must contain some one or more key-words upon which the full emphasis naturally falls. Examples are 'The Prudential has the strength of Gibraltar,' 'If it's Wolsey

It's Wool,' 'It's the Little Daily Dose that Does It,' 'Jovril Puts Beef into You,' 'These Hands may be Yours,' in all of which phrases some or all of the above desiderata are exemplified. The requirement of a good key-word is illustrated in the famous political slogan 'We will have a White Australia,' which had the effect of putting the protectionists in power in Australia and, incidentally, proved the important part mass suggestion may play in advertising. Related to poster advertising are scintillating signs, a form which has been greatly developed in recent years.

*Advertising Agencies.*—Advertising agencies in Great Britain are gradually acquiring a stronger position, but do not as yet enjoy the status of such agencies in the U.S.A. In America, the advertising agent is recognised by newspaper and advertiser alike as the chief factor in the practice or business of advertising, and in consequence the problem of commission has been solved satisfactorily long ago. In Great Britain, however, discussion is still heard on the position of, or even the necessity for, the agent. There is an Association of British Advertising Agents, to which most agents belong, but it is not necessary to be a member; and, generally speaking, the position of the agent in relation both to newspapers and advertisers stands in need of definition. In earlier days the agent had no part in the preparation of copy or layout, but to-day he vies with the advertiser and the advertising staff of a newspaper in the art. Sixty years ago, the agent merely sold newspaper space, but later he suggested the best use to which such space might be put. This change from the position of a mere canvasser was for the better, but the change could not be permanent while the impulse to advertising came from the manufacturer or trader; and it was only when the agent began to make use of propaganda in favour of advertising that the real change came. Rates remain a difficult question, because the large business concerns so frequently employ their own advertising managers, while again the newspapers also employ skillfully managed advertising departments.

*Newspaper Circulation and As.* Revenue from As. is and has long been the mainstay of newspaper enterprise in Great Britain; but the proportion of income which the newspapers derive from sales circulation as compared with that from As. varies greatly with different papers; and, in the case of a popular paper with a very large circulation, it may be assumed that the revenue from As. is about 20% higher than that accruing from sales, so that the latter covers more than half the cost of running the paper. Experts concede that A. revenue should cover about 60% of outlay and provide the profits as well. The importance, therefore, of the revenue from As. is palpable, though the effect on the editorial impartiality of some newspapers may be detrimental to the interests of many of

its readers. The largest circulations do not necessarily bring the highest advertising revenue. A newspaper's power to sell the goods advertised in its columns depends partly on the purchasing power of its readers. Again, advertisers who may be disposed to place undue reliance on a vast 'net sales' total should consider how far the total is artificially swollen by free gifts, insurance benefits, competition prizes, and the like. Conversely, a high-class newspaper or periodical may be better value for advertisers than its small circulation figures suggest: for a single copy, besides being read by a more influential class of persons, may often regularly pass through a great many hands. Most newspapers sell their advertising space at a discount of not less than 25% on their standard rates.

**Advertising in the U.S.A.**—America has so long been regarded as the home of advertising that until very recent years the whole world, including Great Britain, has been satisfied to accept her methods as a pattern and to measure success by the speed with which her newest ideas could be adopted. Although other nations are now striking their own characteristic notes, America still remains a leading force in advertising. Amer. advertising falls into 2 main groups, press and non-press. This clear div. should be recognised, in view of many modern movements and particularly in relation with the fact that the great advertising agencies of America, which are almost a close corporation, provide the main revenues of the newspaper firms, which are themselves closely knit corporations.

Press advertising falls into 2 depts., which appear to be worked on 2 entirely different principles: (1) general national advertising, and (2) mail-order advertising. In the first, of these, where goodwill is built up by a prolonged and persistent series of efforts, the very best available skill in art and writing is eagerly sought for, with results that are often highly pleasing. In the second, where immediate response is essential, every inch of space is crowded to capacity. Posters, sky-signs, cinema films, illuminations, letter-box publicity are among the leading methods outside the press. America is very susceptible to new fashions in advertising, and any idea that gains great prominence is swiftly followed. Thus the craze for aeroplane sky-writing of a decade or two ago has for many years been followed by great displays of floodlights and illuminated and flickering sky-signs. To such an extent has this been carried on that the brilliant illumination of Broadway at night has gained it the name of The Great White Way. The greatest extension of all in America has been in the setting up of special publicity staffs inside thousands of separate firms who were at one time content to employ agencies. A mail-order firm, for example, would regard the advertising dept. as the chief section of its business, and stand or fall by its own efforts. Special-

ists, too, have a vogue. Slogan-writing, form-letter writing, illustration, copy-writing, are not only undertaken by freelance workers, but also by firms that cater for special needs.

See Sir C. F. Higham, *Advertising: its Use and Abuse*, 1925; J. M. Allison, *First Essays in Advertising*, 1926; R. H. W. Cox, *The Lay-out of Advertisements*, 1931; F. B. Lane, *Advertising Administration*, 1931; R. Simmat, *Market Research*, 1931; H. W. Kley, *Advertising Media*, 1932; L. Richmond, *The Technique of the Poster*, 1933; A. P. Braddock, *Applied Psychology for Advertisers*, 1933; H. N. Casson, *A Complete Advertising Course*, 1937; W. G. Briggs, *The Camera in Advertising and Industry*, 1939; J. M. Higginson, *Practical Advertising Management*, 1940; H. W. Hepner, *Effective Advertising*, 1941; F. P. Bishop, *The Economics of Advertising*, 1944; C. K. Shaw, *Industrial Publicity*, 1944; E. A. Lever, *Advertising and Economic Theory*, 1947.

**Advocate** (*Lat. advocatus*, from *advocare*, to call to one's aid) is the name given in ant. Rome and in many modern states, including Scotland (*see* ADVOCATES, FACULTY OF), to a forensic orator. The Eng. term for this is barrister or counsel (*q.v.*). An A. of Aberdeenshire is not a barrister but a solicitor, it having been decided by *McPherson v. Watt*, 3 App. Cas. 254, that solicitors in that county had a right to the appellation. Prior to 1857, the name A. was given to those licensed by the archbishop in the Court of Arches, but since then barristers have been admitted to the eccles. courts.

**Advocate, Lord**, or, as he was called prior to 1598 and is still sometimes called, King's A., is the prin. law officer of the Crown for Scotland, his duties corresponding in the main to those of the attorney-general for England. His office was created by James III. in the year 1480, and his multifarious duties include that of public prosecutor. He has always played an important part in political affairs relating to Scotland, and for a long while was practically secretary of state for Scotland. He was *ex officio* a member of the old Scottish parliament, and after Walpole abolished the office of secretary for Scotland and before the revival of that office in 1885, his power in Scotland was of a most far-reaching nature. Nowadays he is always a member of the ministry, but not of the Cabinet, and he and his assistants, the solicitor-general and the 4 As.-depute, resign when the Gov. who appoints them resigns. A salary of £5000 (and perquisites) is paid to him, but he is not precluded from taking private practice. The L.A. is often, but not always, a member of the Privy Council, but while in office is invariably addressed as the Right Honourable.

**Advocates, Faculty of.** All members of the Scottish bar belong to this body and are called As. Although their name is derived from the Fr. *avocat*, in privileges and liabilities their position closely resembles that of an Eng. barrister. The faculty was founded in 1532, when James V. instituted the College of Justice,

of which it forms part. Limited in the first instance to 10, the members of this faculty now exceed 400, but it is computed that the members who practise are not half this number, and fewer still make a living by the profession. The fact of graduating in the 2 examinations set by the faculty is, however, considered most useful as leading to official or public appointments, and there is consequently no dearth of candidates for admission to the faculty. The first examination is in general scholarship, the second, after the lapse of a year, is in law. The fees payable by the would-be member amount to nearly £350, and include the subscription to the widows' fund of the body and to the As.' library (*q.v.*) maintained by the faculty. The dean, or chairman, of the faculty is elected yearly, and has precedence at the bar even over the crown law officers. The latter, together with the judges of the court of session and the prin. sheriffs, are always selected from the faculty, and only members of it are allowed right of audience in the above-named court. The faculty continues to this day the duty imposed on As. by a statute of 1424, viz. assisting poor litigants (Poor's Roll).

**Advocates' Library**, the largest library in Scotland, and exceeded in size only by the Bodleian library, Oxford, and the Brit. Museum library, London, is situated in the building of the Parliament House, Edinburgh. It was founded in 1682 by Sir George Mackenzie for the use of the Faculty of A., of which he was dean, and it has been maintained by them ever since. In 1692 the library had about 3000 vols., but at the present day the number exceeds half a million, including over 3000 MSS. Since the first Copyright Act, 1709, the A. L. has been one of the libraries entitled to receive a copy of every book copyrighted. It is now called the National Library of Scotland.

**Advocation**, the process by which, prior to its abolition in 1868, an appeal was made from the Scottish sheriff courts to the court of session.

**Advocatus Diaboli** (the devil's advocate), the name of one appointed in the Rom. Catholic Church to set forth possible objections to any person whom it is proposed to canonise, i.e. admit to the calendar of the saints. Opposing the devil's advocate was God's advocate (*A. Dei*). As the objections were generally not valid, and only made as a matter of form, the term A. D. has come to be applied generally to any person who knowingly puts forward arguments with which he himself is in disagreement.

**Adwoson**, the right of presenting an eccles. benefice or 'living' in the Church of England. Such right rests in those who have founded and endowed churches, their heirs or executors, and those to whom they have transferred the right. An A. is a form of real estate and, subject to certain statutory regulations designed to prevent simoniacal practices, may be freely disposed of. It may pass with the sale of a manor, in which case it is called

an *A. appendant*, or separately as an *A. in gross*. Where the patron is a Jew his right lapses to the archbishop of Canterbury, and if the patron be a Rom. Catholic the right of presentation goes to the univ. of Oxford or Cambridge, whichever is nearest to the benefice. When the monasteries were dissolved, the adwosons with great titles passed by Crown grant to some layman, called, in respect of tithes, an impropiator, and in respect of A., a lay rector or patron, but where no such separation has occurred, the living remains a rectory. Recent legislation has much curtailed the right of sale of As. and in time the right will cease altogether.

**Adye**, Sir John Miller (1819-1900), Brit. soldier, son of Major J. P. Adye, was b. at Sevenoaks, Kent, and educated at Woolwich. He served during the Crimean war and Indian mutiny as assistant adjutant-general of the Royal Artillery. From 1870-75 he was director-general of artillery, and in 1882 served in Egyptian campaign; from 1882 to 1886 he governed Gibraltar, retiring in the latter year. He unsuccessfully contested Bath in 1892. Publications: *The Defence of Camperdown*, 1858; *Recollections of a Military Life*, 1895; and *Indian Frontier Policy*, 1897.

**Aduym** (Gk. ἀδυτον), a place that may not be entered. In ant. temples it was the innermost and secret chamber, where oracles were delivered and mysteries performed, and only the priests were allowed to enter therein.

**'A.E.'** see RUSSELL, GEORGE WILLIAM. **Æacus**, the son of Zeus and Ægina, a daughter of the riv. god Asopus. He was king of the Myrmidons, and owing to his justice and piety was made, after his death, one of the 3 judges in Hades. See Horace, *Odes*, ii. 13; iii. 19; iv. 8.

**Æcidium** (Gk. αἰκία, injury), or Cluster Cup, a fruit of a parasite plant belonging to the Uredineæ. It is also the name of the genus of the fungi; *A. cancellatum*, the pear-æ., gives the pear-tree leaves a warty appearance in autumn; *A. berberidis*, the barberry blight, is responsible for the bright orange powdery-looking substance seen on the barberry, in reality the spores of the fungus.

**Ædiles** were Rom. magistrates, first appointed 949 B.C. and elected from the plebs. At first they were the officers of the tribunæ, and had to keep the decrees of the senate in the temple of Ceres (Livy, iii. 6, 55). The 2 curule or patrician Æ. were first elected 364 B.C. (Livy, vi. 42). They had the care of the temples, public buildings, the sanitation of the city, the roads, presided at religious celebrations, and inspected the markets, weights and measures. Julius Cæsar appointed 2 more plebeian Æ. 45 B.C. to look after the corn supply.

**Ædul**, or **Hædul**, a powerful Gallic race who lived between the Loire and the Saône, and were the first to form an alliance with the Romans. Their prin. tn. was Bibracte. See Cæsar's *De Bello Gallico*, l. 10 et passim.

**Ædwine**, see EDWIN.

**Æetes**, son of Helios and Perse, king of Colchis, was the father of Medea and Absyrtus. When Jason came to Æ. for the golden fleece, Medea fell in love with Jason, and after she had helped him to obtain the treasure fled with him to Iolcos, taking with her Absyrtus, whom she killed, and by strewing the pieces of his body on the road detained her father, who was pursuing her. She afterwards returned to her father. Ovid, *Heroides*, xii. 29.

**Ægadian Islands**, anct. **Ægades**, **Ægates**, or **Ægusse**, are 3 small is. off the W. coast of Sicily. In 241 B.C. the Romans here defeated the Carthaginians in a naval battle, and thus brought the first Punic war to an end. Pop. about 6000.

**Ægæ**: 1. A tn. in Achaia on the Crathis, with a celebrated temple of the god Poseidon, originally 1 of the 12 Achaean tns., but its inhab. subsequently removed to Ægira. 2. A tn. in Emathia in Macedonia, the anct. cap. of Macedonia, and the burial-place of the Macedonian kings. It was also called Edessa (q.v.). 3. A tn. in Eubœa with a celebrated temple of Poseidon, who was hence called Ægæus. 4. Also Ægæe, 1 of the 12 cities of Æolis in Asia Minor, N. of Smyrna, on the R. Hyllus. 5. A seaport tn. of Cilicia.

**Ægeon**, in Gk. mythology, son of Uranus (Heaven) by Gæa (Earth). Æ. and his brothers Cœus or Gyges and Cottus are known under the name of the Uranids, and are described as huge monsters with 100 arms and 50 heads. Most writers mention the third Uranid under the name Briareus instead of Æ., which is explained by Homer, who says that men called him Æ., but the gods Briareus (q.v.). According to the most anct. tradition, Æ. and his brothers conquered the Titans when they warred against the gods, and secured the victory to Zeus, who thrust the Titans into Tartarus and placed Æ. and his brothers to guard them. Other legends represent Æ. as one of the giants who attacked Olympus; and many writers represent him as a marine god living in the Ægean Sea.

**Ægagre**, a species of wild goat or ibex, found in the mts. of E. Europe and of Persia, where it is called *paseng*. The oriental bezoar, a stone once supposed to possess medicinal virtues, is sometimes found in its stomach.

**Ægean Sea and Islands**, the name used by the Gks. and Romans for that part of the Mediterranean Sea between Asia Minor and Greece. It is now called the Archipelago, containing, amongst many other is., the Cyclades and the Sporades and the Dodecanese group. The Dodecanese is.—Rhodes, Scarpanto, Kos, Astypalaia, Patmos, Kaxo, Kharki, Nisyros, Leros, Kalymnos, and Tilos—were in It. occupation up to late in the Second World War. Italy occupied some of the Dodecanese is. during the Tripolitan war, 1911-12, at a time when they belonged to Turkey. In the First World War, Greece, as the price of joining the Allies in the Dardanelles campaign, demanded the Æ. is., but further bargaining by Venizelos (q.v.) was

stopped by King Constantine, who dismissed his Premier. Later in the same year Italy demanded as compensation from Austria-Hungary the *de jure* sovereignty of the Æ. is. In the post-war settlement Greece was granted all the coasts and is. of the Æ. S., but after further negotiations in 1919-20 between Italy and Greece, Italy, by the treaty of Sèvres, abandoned her claims to most of the is. (except as to Rhodes) in favour of Greece, and Greece in return agreed to lease to Italy the site of a coaling station in the is. and to recognise an It. protectorate of most of Albania. After the treaty of Lausanne, 1923, Turkey denounced the treaty of Sèvres and ceded the is. to Italy. Greece, however, still claimed the Dodecanese is. On Sept. 16, 1943, following Italy's surrender, allied forces landed on Samos, Leros, and Cos, and joined the It. garrisons there. But on Oct. 3 the Gers. delivered a strong attack on Cos, which they took. They then turned to invade Leros which the Brit. held until Nov. 16; and as a result Samos was evacuated and the projected allied invasion of the Balkans had to be postponed. Had not the Its. surrendered Rhodes and its aerodromes to the Gers. without firing a shot, Cos and Leros might have been held, although in order to attack the is. the Gers. had to divert large land sea and air forces from Italy and Russia.

**Ægeus**, king of Athens, was the son of Pandion and father of Theseus. He was restored to the throne (from which he had been driven by the 50 sons of Pallas) by his son Theseus. Theseus went to Crete to deliver Athens from the tribute it had to pay to Minos, promising that he would hoist white sails on his return as a signal of his safety. He, however, forgot to do so, and Æ., thinking his son had perished, threw himself into the sea. From this event the Ægean Sea has received its name.

**Ægidius Romanus**, see COLONNE.  
**Ægina**, a small rocky is. and tn. in the gulf of Æ. or Saronic Gulf. On a hill in the N.E. of the is. was the temple of Zeus Panhellenus, the ruins of which still remain. It was occupied by the Achæi (Homer, *Iliad*, ii.) and afterwards by Dorians. It became a place of great commercial importance (Herodotus, ii. 178; vii. 147), and its silver coinage was the standard in most of the Dorian states. In the sixth century B.C. it was an independent and powerful state and the chief seat of Grecian art. In 429 B.C. the Athenians took possession of the is. and expelled the inhab. (Thucydides, ii. 27). Area 32 sq. m.; pop. (is.) 9000, (tn.) 5000.

**Ægis**, a representation of the storm-cloud with snaky lightnings twisting around, was the shield of Zeus, and a token of his power. Athena also wore the Æ. with the Gorgon's head (Horace, *Odes*, iii. iv. 57). It was a symbol of protection.

**Ægisthus** was the son of Thyestes, whom he placed upon the throne, driving away his uncle Atreus. According to Homer, Æ. took no part in the Trojan

war, and during the absence of Agamemnon he seduced his wife Clytemnestra (*Odyssey*, iii. 329). He murdered Agamemnon on his return home, and reigned for 7 years over Mycenæ (*Odyssey*, iii. 388). Orestes, the son of Agamemnon, then killed Æ. (*Odyssey*, iii. 242). Æschylus, Sophocles, and Euripides also give an account of this story.

**Ægium**, a tn. of Achaia, on the Corinthian Gulf, in anc. times chief city of the Achæan League. It was a legendary bp. of Zeus. Vostitza, the modern tn., exports currants.

**Ægospotamos**, a small riv. ('goat's riv.') flowing into the Hellespont and a tn. on it, in Thracian Chersonesus. Here Lysander utterly defeated the Athenians, 405 B.C. See Plutarch's *Alcibiades*, 36.

**Ægrotat** (Lat., he is ill), a medical certificate given to univ. students to explain their absence from lectures. An *Æ.* degree is sometimes given to students unable to sit for their final examination on account of illness, but whose known proficiency justifies the bestowal of a degree without examination.

**Ægyptus**, king of Egypt, son of Belus, and twin brother of Danaus. Æ. had 50 sons, and Danaus 50 daughters. Danaus, fearing the sons of Æ., fled with his daughters to Argos, where he was followed by the sons of Æ., who demanded his daughters in marriage. Danaus granted their request, but, giving each daughter a dagger, ordered them to murder their husbands on the wedding night. Thus all perished except Lynceus, the husband of Hypermetra, who did not obey her father's instructions.

**Aehrenthal, Alois L. B., Count Lexa von** (1854-1912). Austro-Hungarian diplomatist, foreign minister (succeeding Count Goluchowski) in 1906. He was son of Baron Johann Lexa von A., and was b. at Gross-Skal in Bohemia; studied law at Prague and Bonn; entered the diplomatic service 1877 as attaché to Paris embassy; at St. Petersburg 1878-1883; then chief of the Cabinet to Count Kalosky. At St. Petersburg as councillor of legation 1888-94; minister at Bucharest 1895-99; ambassador at St. Petersburg 1899-1906. Thenceforth he directed the foreign policy of the dual monarchy till his resignation on the day of his death. He was friendly to Italy; had no sympathy with Russian liberalism, and little belief in the disinterestedness of Ger. support of his annexation (in defiance of the treaty of Berlin) of Bosnia-Herzegovina Oct. 6, 1908: one link in the chain of causes of the First World War of 6 years later. He was very formal in his acknowledgment of the Emperor William's 'shining armour' assurance, made Sept. 21, 1910, at Vienna. A. was made a count (Graf) Aug. 18, 1909. All his efforts were for the aggrandisement of Austria-Hungary. In 1902 he married Pauline, Countess Széchenyi.

**Ælfrie**, a distinguished Saxon prelate, became abbot of St. Albans, bishop of Wilton, and archbishop of Canterbury from 995 until his death in 1005. He

was one of the most learned ecclesiastics of his time.

**Ælfrie**, an Eng. writer who lived at the end of the tenth century. He has been confused with Æ., archbishop of Canterbury from 995 to 1003, and with Æ., archbishop of York, but it is certain that he was a pupil of Æthelwold, and most probable that he was an abbot at Winchester. He afterwards became abbot of Cerne and of Emsham; but he is most celebrated for his 2 books of *Homilies*, trans. from the Lat., and ed. by Thorpe for the *Æ.* Society (1814-46). They are a good illustration of the doctrine of the early Eng. Church. Among his other works are: *A Latin and English Grammar and Glossary* (from which he is called (Grammaticus), first printed by Somner, 1659, and included in Prof. Zupitza's *Sammlung Englischer Denkmäler*, 1880; *Colloquium*, and *A Treatise on the Old and New Testaments*, besides translations, epistles, and other treatises.

**Ælia Capitolina**, a name given to Jerusalem by the emperor Hadrian when he had driven out the Jews and there established a Rom. colony c. A.D. 132.

**Ælianus**, Claudius, who lived at the end of the second century A.D., was a Rom. citizen and writer, and a native of Pheenoste (Paestrum). He was the author of *Varie Historie* (composed in Gk. in 14 books), and *De Natura Animalium* (also in Gk. in 16 books).

**Ælla** (d. 588) was the son of Iffa and grandfather of Oswald, and became first king of the Deirans, 559.

**Ælred, Aired, or Ethelred, St.** (1109-1166), historian, was b. at Hekham, and at an early age entered the household of David I. of Scotland. He refused a bishopric, becoming a monk in the Cistercian abbey of Rievaulx, but later was elected abbot of Rievaulx, Lincolnshire, in 1143, and of Eveshaux in 1146. He was noted for his gentleness, asceticism, and the piety of his life, and on a mission to the Picts of Galloway in 1164 he induced the chief to become a monk. His works, which have never been collected in a complete ed., include the *Vita et Miracula S. Edwardi Regis et Confessoris*, *De Bello Standardii* (waged in 1138), and *De Spirituum Amicitia*. See *Vita S. Ælredi* in the Bollandist *Acta Sanctorum*, Jan. ii., p. 39, and T. Tanner's *Bibliotheca Britannico-Hibernica*, 1748.

**Aeltre**, an industrial tn. of W. Flanders, Belgium, which manufactures canvas and exports oil; pop. 7000.

**Æmilian Way** (Lat. *Æmilia Via*), a famous highway of anc. Italy which continued the Via Flaminia from Ariminum (Rimini) through Bononia (Bologna) to Mutina, Placentia, and Mediolanum (Milan). It was constructed by Consul M. Æmilius Lepidus in 187 B.C.

**Æmilius Paulus, Lucius**: (1) was twice consul at Rome, the first time with Marcus Livius (Livy, xxi. 35), and was killed in battle near Cannæ, 216 B.C. (Livy xlii. 21). (2) The son of the above—became curule ædile, prætor, proconsul, and consul 182 B.C. and 168 B.C. He

commanded an army in Liguria, and completely defeated the Ingauni, 182-1 B.C. In 168 B.C. he was in command of the war against Perseus, who was finally defeated at Pydna in Macedonia. Æ. d. in 160 B.C. (Livy, xxxiv.-xl. and xlv.-xlv.).

**Æneas**, the hero of Virgil's *Æneid*, the son of Anchises and Aphrodite, was b. on Mt. Ida, and was, next to Hector, the greatest of the Trojan heroes. It was not until he was attacked by Achilles on Mt. Ida that he took part in the Trojan war, and led his Dardanians against the Gks. According to most accounts he withdrew to Mt. Ida after the capture of Troy, crossed over to Europe, and finally settled at Latium in Italy. The account of his wanderings is given in Virgil's *Æneid*. He left Troy carrying his aged father on his back, but in the confusion of the flight he lost his wife Creusa. He sailed to Thrace, and then, misinterpreting the oracle of Delphi, went to Crete, thence to Epirus and Sicily. He was then driven by a storm on to the coast of Africa, where he met Dido, with whom he tarried for a while and who vainly loved him. He then sailed to Latium, founded the tn. of Lavinium, and married Lavinia, daughter of Latinus, king of the Aborigines. Turnus, to whom Lavinia had been betrothed, made war on Latinus and Æ. Latinus was killed and Æ. became sole ruler of the Aborigines and Trojans, uniting both nations into one. Turnus was killed by Æ., and Æ. himself was killed whilst engaged in battle against the Rutulians.

**Æneas Silvius**, son of Silvius, and grandson of Ascanius, was the third of the mythical kings of Alba in Latium.

**Æneid**, the greatest work of Virgil, and the national epic of the Rom. people. It was completed in 12 books, but as it was not revised Virgil expressed a wish that it might be destroyed. It was, however, pub. after his death by Tucca and Varius. It contains an account of the wanderings and the settlement of Æneas after the siege of Troy. It has been trans. into Eng. prose by Conington (London, 1870) and by Mackail (London, 1885); and into Eng. verse by Gavin Douglas, 1553; Dryden, 1697; C. H. Kennedy, 1861; J. Conington, 1866; W. Morris, 1876; W. J. Thornhill, 1886; T. H. D. May, 1903; E. Fairfax Taylor, 1903; A. S. Way (1.-ix.), 1916-29.



ÆOLIAN HARP

**Æolian Harp**, a musical instrument consisting of a wooden box over which are stretched sev. patent strings of different thicknesses, tuned in unison. When exposed to the wind harmonious sounds are produced. It is supposed to have been invented by St. Dunstan, but the present Æ. H. was not known until about

the end of the sixteenth century. It is mentioned in Thomson's *Castle of Indolence*.

**Æolian Islands**, see LIPARI ISLANDS.

**Æolians**, one of the branches of the Gk. race, who originally dwelt in Thessaly. From there they settled in N. Greece and Peloponnesus. They also immigrated to the N.W. of Asia Minor, establishing 12 cities along the coast dist. known as Æolis, and to Lesbos and Tenedos.

**Æolina**, a very small musical instrument, consisting of short elastic metallic springs fixed in a frame, and acted on by the breath of the performer. Some comprise 3 octaves of diatonic sounds. Also the name given by Sir Charles Wheatstone in 1829 to the mouth-organ, or harmonica (U.S.A.), the invention of which is attributed to him.

**Æolipyle**, or **Æolipile** (from Lat. *Æolipyle*, the gates of Æolus), a metallic ball partly filled with water, and having tubes projecting horizontally. When heated steam rushes out of the tubes, setting the ball in motion. It was first described by Hero of Alexandria.

**Æolis**, see ÆOLIANS.

**Æolus**: 1. Ruler of Thessaly, and founder of the Æolic branch of the Gk. nation. 2. Son of Hippotes, or, according to others, of the god Poseidon. According to Homer he was the ruler of the Æolian Is., and was given power over the winds by Zeus. See also Ovid, *Heroides*, xi. 65-128.

**Æon** (αἰών), a word meaning age or eternity, denoting an infinite period of time, also a being that lives for ever. The Gnostics use the term to indicate manifestations from God, i.e. spirits which form a separate existence, having influence over phases of the world's progression.

**Æpinus**, Franz Ulrich Theodor (1724-1802), a Ger. natural philosopher. He is most widely known for his works on research in magnetism and electricity. He pub. *Tratamen Theoric Electricitatis* in 1759, and among other works memoirs on astronomy and its kindred subjects.

**Æpyornis**, a huge, wingless, and long-extinct bird, the existence of which may explain the fabled roc of Arab legend. It belonged to the family Æpyornithidae containing a number of allied forms, one class of which is as large as the dinosaurs. The former existence of the bird was inferred from the eggs found in the marshes of Madagascar, which were 36 in. in circumference, and from the later discovery of bones which showed that the Æ. was similar to, but much larger than, the apteryx. Ornithologists state that it resembled the ostrich, had long, thick legs, 4-toed feet, rudimentary wings, and stood over 7 ft. high.

**Æqui**, a tribe of anct. Italy. They waged incessant war against the young Rom. republic. Their great stronghold was Mt. Algidus. In 446 B.C. they made their last assault upon Rome. They were eventually subjugated by the Romans, after a great struggle which began in A.D. 301.

**Aerated Bread** is made from dough



prepared by mixing the flour with water strongly charged with carbon dioxide. This process produces the requisite degree of porousness in a few minutes, as compared with hours by the ordinary yeast method.

**Aerated Waters**, water artificially charged with more carbon dioxide than it would dissolve under atmospheric pressure, and often containing dissolved medicinal salts or flavouring matter. They were invented in the eighteenth century by the famous chemist Joseph Priestley (*q.v.*). The use of A. W. was suggested by the existence of mineral springs where water issues forth with considerable quantities of carbon dioxide in solution, causing effervescence when exposed to the ordinary pressure of the air. The term A. W. is not here applied to the natural products of springs (*see* MINERAL WATERS), nor to liquids like bottled beer, ginger beer, champagne, etc., where the carbon dioxide is produced by fermentation (*see* FERMENTATION).

There are many varieties of machinery for the manuf. of A. W., but they contain the same essential features. The gas is usually obtained by treating chalk with sulphuric acid; from the gas generator it passes into a washer, where it is purified by passing through water. It is then stored in a gasometer, whence it issues to the condensing apparatus together with the water or liquid with which it is to be incorporated. Here it is thoroughly mixed and then bottled under pressure. The bottles are often closed by stoppers held in place by internal pressure, but screw stoppers are also used. Larger bottles have what is called a siphon arrangement. A tube passes nearly to the bottom of the vessel and communicates with a spout by a spring valve; on operating the valve the pressure of the gas drives the liquid out with some force. The *seltzogen* is a simple arrangement for home use. It consists of 2 globes connected by a wide tube reaching nearly to the top of the smaller or upper globe. A narrow tube passes from the bottom of the larger globe through the connecting wide tube to a spring valve communicating with the spout. A mixture of tartaric acid and bicarbonate of soda is placed in the smaller globe, and sufficient water tilted from the larger globe to fill about one-third of the upper globe. Gas is produced when the mixture is moistened; it dissolves under its own pressure in the water in the reservoir, and on operating the spring valve can be withdrawn as in the ordinary siphon. Carbon dioxide is also supplied in a greatly compressed form in little steel capsules which are introduced into a specially constructed siphon. On screwing in the top a sharp point pierces the capsule, liberating the gas and supplying the necessary pressure.

A. W. used for medicinal purposes contain potassium bicarbonate (*potash*), sodium bicarbonate (*soda*), citrate of lithia (*lithia*), or compounds corresponding to some of the well-known continental mineral waters. Those used purely as beverages contain a very small

proportion of fruit syrup and occasionally colouring matter to give an attractive appearance.

**Aerial (or Antenna)**, in radio communication, the conductor or group of conductors, usually raised above the earth's surface, by means of which electric waves are emitted or radiated when high-frequency oscillatory currents are sent into the wires. A similar A. is employed at the receiving station to convert the arriving electric waves into oscillatory currents which actuate the receiving apparatus. The simplest A. consists of a single vertical wire supported by and insulated from a suitable mast. When the available height of mast is small compared with the wavelength used, the A. is frequently extended in a horizontal direction in order to increase its capacity and thereby its 'effective height.' The natural wavelength of an A. is that wavelength at which the A. is in resonance when connected to earth without any additional reactance. For a simple earthed vertical A. the natural wavelength is a little more than 4 times the length of the A. Some types of A. in use are in the form of closed loops, with one or more turns of wire, the inductance so formed being tuned by a variable condenser to resonance at the working wavelength. These frame As. are employed in portable receivers and direction-finders as well as in special types of transmitter. In Great Britain, a private receiving A. must not exceed 100 ft. in length.

**Aerial Navigation** is the science that deals with all points of practical flying, outside the actual working of the machine itself. It includes fixing one's geographical position, maintaining a course, and selecting an altitude favourable with regard to wind and weather.

The best way of fixing position, called the *dead reckoning*, is by recognising objects on the ground. This, however, is not always possible. In *dead reckoning* navigation allowance has to be made for wind. Aircraft cannot travel along a set 'track,' unless the 'track' runs fore and aft with the wind. Ordinarily the actual path of the machine is at an angle to its course, called the *drift angle*. For *dead reckoning* navigation it is necessary to know the true air speed and the wind velocity. The *air-speed* indicator gives the speed of the aircraft in relation to the air. It is an *air-pressure* gauge, and, since pressure decreases with altitude, true air speed is found by adding  $\frac{1}{4}$  per cent to the reading of the indicator for every 1000 ft. of altitude. There are also instruments—the *aero bearing plate* and the *wing gauge bearing plate*—which register the drift of the aircraft and the velocity of the wind.

The *Aero Compass* consists of a bowl of non-magnetic material filled with liquid and fixed to a mounting constructed to overcome vibration. The iron used in the construction of the aircraft causes a deviation of the compass needle, and this has to be corrected by compensating magnets.

The *Altimeter* is an aneroid barometer, which records the atmospheric pressure at any altitude. Pressure on the earth's surface decreases in proportion to the altitude. A fall of  $\frac{1}{4}$  in. corresponds to a rise of 90 ft. The altimeter, however, records changes in pressure due not only to altitude, but also to weather.

The *Gyro Turn Indicator* enables the pilot to keep his machine level when flying straight and to bank at the correct angle when turning. It consists of an air-driven gyroscope, which reacts only to motion about a vertical axis and is unaffected by rolling or pitching.

*A. N. at Night or in Bad Weather.*—The pilot equipped with radio can obtain 'fixes,' bearings, or meteorological information on request from major airports. Such airports have a control organisation for regulating traffic within a zone extending in some cases up to 35 m. The navigator is helped by the airport's runway, boundary, and taxi-track lights and by the aids to landing in poor visibility. These include radio and radar beacons, which indicate on the aircraft's instruments the approach path it must follow to arrive at the end of the runway. Another system allows the track of the incoming aircraft to be followed by radar and approach instructions to be given by radio to the pilot. The control also instructs pilots the heights and courses to follow within the control zone, and this is of the utmost importance, particularly in foggy weather.

*Aerial Laws.*—The first International Air Convention, 1919, laid the foundation of trustworthy communication by air between one country and another. At this time separate provisions were made for Germany under the treaty of Versailles, articles 313 to 320. When Germany became a member of the League of Nations, these were abrogated, and Germany abided by the international convention. The main clauses of the convention establish a nation's sovereignty over the national atmosphere, made a certificate of airworthiness obligatory for all machines, and forbade the carrying of such cargo as high explosives from one country to another. An international commission for A. N. was also set up to deal with all points of aerial law.

See C. M. Botley, *The Air and its Mysteries*, 1938; F. G. Brown, *Air Navigation*, 1941; M. J. Hearley, *Air Navigation: Some Problems and their Solution*, 1942; D. E. Webster, *Air Navigation for Cadets*, 1942.

*Aerial Perspective*, see PERSPECTIVE.

*Aerial Surveying*, see SURVEYING AND LEVELLING.

*Aerial Warfare. Experimental Period.*—Military aviation was in the experimental stage in 1912. The Central Flying School at Upavon was opened in that year and a beginning was made in the instruction of pupils in map-reading and signalling. In the same year military aeroplane trials were held on Salisbury Plain with a view to finding the most suitable type of fast good-climbing machine, able to take off and alight on

rough ground, and to pull up within a reasonably short distance after alighting. These trials did not evolve a suitable machine, but they gave a real stimulus to the aeroplane industry. Progress was rapid thereafter, and early in the First World War a good 2-seater machine could rise to a height of nearly 10,000 ft. in less than 10 min. In the army manoeuvres of 1912 the reconnaissance work of the aeroplanes was a complete vindication of the Royal Flying Corps, in spite of the fact that previously, in bad weather, their co-operation in cavalry divisional training had not been highly successful. Only biplanes were used, monoplane being forbidden owing to the record of fatal accidents. But the sole use in war for which the machines of the military wing of the Royal Flying Corps were designed and the men trained was reconnaissance. This was so up to the beginning of the war. It was in the stress of war that experiments in other directions, such as the regulation of artillery fire, were applied with practical effect on a large scale. The Brit. military wing was much smaller than the military air forces of either France or Germany, and was designed merely to operate with a C-Division Expeditionary Force as the 'eyes' of that force. Later, when the Gers. were forced back from the Marne (Sept. 1914), the function of co-operating with the artillery became one of the first importance. During the war, too, the aeroplanes usurped many of the duties hitherto believed possible only for the airship—namely, aerial photography, bombing, and the sending and reception of wireless messages. The performance of these duties was, however, postponed until such time as the Royal Flying Corps grew sufficiently in numbers to be able to do them without jeopardising the more essential work of reconnaissance.

The naval wing of the Royal Flying Corps developed on different lines from the military wing. Co-operation with the Navy required conformity to the doctrine that the best defence is attack. Though aircraft were capable of defending the Brit. coasts, they were not as yet (1912-13) in theory capable of carrying war whithersoever the fleet might go. In 1913 the Admiralty adopted the policy of evolving 3 new types of machine: an overseas fighting seaplane capable of operating from a battleship as base; a scout to work with the fleet at sea; and a home-service machine for driving back enemy aircraft from our coasts and for patrolling the coast. Progress was slower than with the military wing because the problems were more difficult. The detection of submarines from the air and the use of depth charges by surface craft acting in co-operation were a problem which called urgently for solution. Experiments gradually yielded results, and before the war was over the U-boats had learned to fear the seaplane as their most deadly foe. Aircraft also proved to be the U-boat's master in the Second World War.

For the rest, progress was made in the early years of the war in bomb attack by means of an efficient dropping gear; in the effective use of small-bore fire-arms against attack by Zeppelins, especially by the invention of the tracer bullet, and in the mounting of machine-guns on aeroplanes.

*Development in First World War.*—The Ger. Army at the outbreak of war possessed 12 rigid airships and were constructing others. Their airship engines were of 200 h.p. and more, and were capable of modification for use in aeroplanes. Probably Great Britain had the fastest machines in Europe, but preoccupation with reconnaissance handicapped the Brit. service in other directions, so that for a time both the Ger. and Fr. armies were more adequately equipped for aerial warfare than the small Brit. expeditionary force. Early in the war, however, the Brit. machines rendered most essential service. Numerous reconnaissances during the Great Retreat (Aug. 1914) gave Sir John French accurate information on the location of the enemy and of his batteries. The Great Retreat also saw the beginnings of fighting in the air as distinct from reconnaissance and artillery fire direction. About this time an important change in organisation was made by the decentralisation of the Royal Flying Corps, so that certain squadrons were attached to the corps commands. This experiment, which followed the Ger. organisation, saved time by enabling observers to report direct to the corps to which they were assigned instead of going back to their own centre. In the Ger. Army the pressure of duties on so extended a front made it impossible to do much more than reconnaissance work, although its flying force was very large. Its most active machines were the single-seater scouts and, later, the 'trench-strafting' machines. The precursors of these latter were the escort squadrons originally estab. for the protection of 'working machines.' The function of the escort was to ward off attack from the 'working machines' which were carrying out patrols or observations. The 'trench-strafting' machines flew by day over Fr. and Eng. trenches, dropping bombs, and then, at night, flew behind the lines to damage billets, stations, and other objectives. The prin. duty of the artillery observation machines in the 1917 operations consisted in relieving the pressure upon the infantry by subduing the allied artillery (Aisne-Champagne front). In every group certain machines were told off to undertake fire control for Ger. long-range guns. Bombing squadrons came under the direction of the army groups, and were used against depots, camps, and other traffic centres. Duels in the air became very common in the later years of the war. The term ace became the accepted title of a Fr. airman who had 'bagged' a certain number of enemy machines. In the last 2 years of the war all the duties enumerated in this article had come to be performed by all the flying forces on

either side and A. W. had reached, under the stress of war, a pitch of development which before the war had hardly been dreamt of.

*Modern A. W.*—Air raids and air attacks were extensively employed as an instrument of modern warfare in Abyssinia, China, and Spain; but in none of these instances was any effective resistance possible. In Abyssinia (*q.v.*) the abrupt termination of the war in the early months of 1936 was largely due to the terror inspired by air raids; in the Sp. Civil war, 1936-39, the bombing of Guernica, Barcelona, Madrid, and many other open towns, by Franco's machines was a decisive factor against the Republicans who had no great resources in either bombing machines or fighters; while the Jap. bombing of Hankow and Canton soon reduced those places to submission. The results of It. aerial action in Abyssinia, with practically unfettered scope, provided an excellent example of what modern aircraft can do in a colonial war, and it is from that point of view that the aerial aspect of the Italo-Abyssinian campaign is to be judged. The chief purposes for which aircraft were used in Abyssinia were: reconnaissance; bombing of places regarded as being of strategic importance; co-operation with ground troops in attack; inter-communication and pursuit; supply and transport; propaganda behind the Ethiopian lines; and map-making by photography. Before the outbreak of the Second World War many experts made ingenious and not entirely inaccurate predictions of the kind of thing that would happen in the air in a new major war. In particular, numerous books appeared giving alarming accounts of the effects of bombing on large cities, and there were not altogether unjustified pictures conjured up of tremendous air battles. In this respect Gen. Douhet's works had considerable influence among air staff officers all over the world. And in 1931, a year after his death, the It. conducted manoeuvres in the air which were designed in accord with his theories. Fortunately Britain had different ideas. Had the Brit. air staff followed Douhet, Britain would have had a much more powerful bomber force, but almost no interceptor fighter force at the outbreak of war in 1939. We might, in those circumstances, have so battered the Gers. that they would never have been able to launch their great raids on Great Britain, and in that event we should never have needed interceptor fighters. But the risk would have been appalling. For had the bombers failed to crush Germany's power to strike, Britain would have been without adequate interceptor protection, and the Luftwaffe would have bombed the Brit. S. ports, aerodromes, factories, and centres of pop. at their will. Had Douhet lived he would have had some difficulty in adjusting the facts of the battle of Britain to his theories, for he expatiated always on the offensive qualities of aircraft, having little belief in their defensive powers. Yet if he did not

foresee the power of the fighter he foresaw that of the bomber. He almost exactly described the kind of tactics which the day bomber forces of the United States Eighth Army Air Force employed in its raids on Germany in 1943-44—the close formations which were held at all costs and the great fire power. But again he underestimated the effectiveness of the fighter defences against these attacks in many instances. Douhet wanted the armies and navies to be concentrated on defending and holding, while every effort should be expended on constructing huge fleets of bombers which would assume the entire responsibility for offensive operations. It was an offshoot of this central idea that led him to exalt the mass of aircraft against the individual performer, and to decry the idea of the ace fighter pilot. Up to the end of 1943 the bombing of Berlin showed that the complete destruction of a great cap. city was not quite so easily accomplished as Douhet supposed; but though no attainable bomber force in the Second World War could do what Douhet suggested—completely destroy a target in a single attack—the cumulative effect of repeated attacks was almost as destructive; while the lesson of Hiroshima and Nagasaki in 1945 proved that one aircraft carrying an atomic bomb could achieve more than the largest bomber force not armed with atomic bombs. A. W. developed enormously in the Second World War and, indeed, it is not too much to say that the aeroplane became the master weapon, counteracting to a disturbing extent the received doctrines of sea-power and rendering gallantry in defence by large and well-equipped forces nugatory where these latter were inadequately supplied with aircraft, as e.g. in the Cretan campaign, the Gk. campaign, and in the Jap. invasion of the Malay Peninsula. Moreover, in the Second World War, bombing of open tns., as was expected, became a common feature, the Ger., It., and Jap. commands relying to a great extent on it as a means of destroying civilian morale. Used, however, by the Brit. Command against legitimate objectives aircraft were often a decisive factor, e.g. in the seaplane attack on the It. fleet at Taranto and in the constant bombing of the Ger. munitions centres in the Ruhr. The Jap. plane attack, without any previous declaration of war, on Pearl Harbour in 1941 was also decisive in immobilising Amer. naval power in the S. Pacific.

*Brit. Policy of Strategic Bombing in Second World War.*—Early in 1942 parl. critics cast doubt on the military effectiveness of strategic bombing and regarded the Gov.'s decision to open a 'second front' at some time as implying an acknowledgment of the failure of its bombing policy. The critics were over-impressed by the quality of the Ger. defences by fighters, searchlights, and anti-aircraft guns, forgetting that, in due time, Britain's development in all these respects might well become so much greater as to discourage hostile retaliation, while the Brit.

bombing offensive would become immeasurably heavier without, at the same time, involving the failure to provide the aircraft required to make land and sea operations successful. The escape of the Ger. ships *Scharnhorst* and *Gneisenau* from Brest, notwithstanding repeated bombings, lent plausibility to the arguments of the critics of long-distance bombing; but their arguments, if valid, would have discredited bombing as such, whether long-distance or otherwise. That the building of 4-engined bombers for long-distance strategic bombing did not affect the aircraft-building programme was estab. by the Gov.'s realised policy of building up the Fighter, Coastal, and Middle E. Commands as a first charge on the resources of the empire and only to use the residu of the capacity for Bomber Command. The fact that by 1943 the Bomber Command was able constantly to send great bombing fleets over Germany and Italy was but further proof of the great extent of the resources of the empire. Nor was there any justification for the fear that strategical bombing was carried out without regard to the requirements of the other arms; indeed the bombing of Brest and Lorient was motivated by the hope of helping the Navy and Mercantile Marine against the submarine menace. Moreover, at times the great raids on Germany ceased whenever other and more pressing tasks called for the diversion of aircraft; e.g. there was a lull after the 1000-bomber raids on Cologne and Essen (May-June 1942) owing to the urgent requirements of the Middle E. Command, where the situation had become very dangerous, and, in order to co-operate with Coastal Command and the R.N. in the battle of the Atlantic, at that time the most vital of all theatres of war. The role of the R.A.F., far from being an independent one, was to co-operate with the Army in the tactical field, and only after that task had been performed was it free to devote itself to other operations. This was shown by Air Vice-Marshal Tedder's brilliant operations in Libya in support of Gens. Alexander and Montgomery against Rommel in 1942 at El Alamein. Actually Bomber Command's strategical operations, though widely advertised, had not up to July 1941 done Germany's war potential any great damage and no doubt the pilots and air crews were deceived on some occasions by the ingenious devices which the Gers. adopted to mystify them, especially that of lighting large fires outside centres which were about to be bombed so as to induce the raiders to drop their bomb-loads there and not on the real target. Brit. bomb-loads in 1940-41 were puny judged by the standards of 1942 and later and were incapable of doing any serious amount of damage, e.g. 15 tons was regarded as a formidable weight, but 1500 tons or more were often dropped in 1943 in well under an hour's bombing; and also the number of incendiaries dropped was insignificant in comparison with those subsequently scattered. The

greatest load ever dropped on London or anywhere in Britain by Ger. bombers was 450 tons; yet that total was much in excess of that dropped on Germany in the later part of 1940. The tables were turned by the spring of 1942, e.g. Lübeck, on Mar. 28, 1942, received a load 50 per cent greater than Coventry had received on Nov. 14, 1940. Yet the Brit. air offensive of those earlier years was by no means futile, for it compelled the Gers. to create a second front in the air which extended right across the Reich and throughout the occupied countries of W. Europe and thereby to deplete their air forces elsewhere. The benefit which the Bomber and Fighter Commands' activities conferred on Britain's Russian allies in their gallant resistance was obvious from the transfer of fighter squadrons of the Luftwaffe from the E. to the W. front. Further, Bomber Command's activities in this earlier period kept the spirit of attack alive at a time when the Brit. Army could do but little and while the Navy's work was obscured in the mists of the Atlantic. The only arm which could hit the enemy was the Air Arm, and while the Coastal and Fighter Commands struck whenever opportunity offered, Bomber Command struck all the time. Even in 1940 Brit. bombing raids were widespread. In 3 nights in Sept. of that year they attacked objectives in over 40 cities. It was then the exception to concentrate attack on one or two centres at a time. Pinprick raiding was probably the right policy in 1940, for the Bomber Command had to make the most of restricted forces, and the price the Brit. people had to pay at home for their bombers' aggressiveness was endured with steadfastness and fortitude. But even as early as Dec. 1940 the weight of Brit. attacks began to be directed to special areas where industry and transport were concentrated—a change due to the simple cause that more crews and more aircraft were gradually coming into action. Long before 1943 Ger. raids over Britain had grown insignificant; those over Germany had become avalanches. The Gers. were early perturbed by the Brit. raids—even in the autumn of 1940. They even tried to persuade the Brit. people that night bombing was out of date and achieved nothing. But if bombers were to be used, no logical distinction could be drawn between night and day bombing.

*Limitations of International Law re-interpreted.*—Gradually Brit. bombing re-interpreted the limitations of international law concerning identifying targets and taking 'reasonable care not to bomb civilians' to the wider conception of bombing 'target areas.' Yet strictly area-bombing was legitimate, the question being, as e.g. in a naval bombardment, whether the incidental destruction of civilian life and property can be justified by the military advantage to the attacking belligerent of the effective destruction or reduction of the enemy's capacity to make war. If, because of intense anti-

aircraft fire or other reason, the only way to make sure of putting the objective out of action is to place a pattern of bombs over the area where it is known to be situated, it is not contrary to international law to bomb that area, whatever the consequences to civilian life. But in any case the Gers. could not logically question this or any similar practice. Not long after the change or development of Brit. bombing policy, bombs known as high-duty bombs were brought into use by the R.A.F. To the Gers. they were known as block bombs, because they could destroy whole blocks of buildings. They were first used against Emden (Mar. 31, 1941) and later with devastating effect on Cologne, Essen, Hamburg, Düsseldorf, and other towns with great industrial areas. Brit. bombing was still strategic, but inevitably it also had a psychological effect on Ger. civilian morale, the more so as the Ger. Gov. had early assured the people that no Brit. bomber would ever reach a Ger. city. Bomber Command's offensive was essentially a night offensive; but occasionally a daylight raid was made by heavy bombers, notably on Apr. 17, 1942, when a score of Lancasters bombed Augsburg; and again on Oct. 17, 1942, when 94 Lancasters made a low-level attack lasting 7 min. on the Schneider armament works at Le Creusot, for the loss of only 1 machine, and that by mischance, there being no opposition. But medium bombers and fighter-bombers were more often used for daylight sweeps into the Low Countries and France, Blenheims being the machines mostly used. Hurricane fighter-bomber machines were also employed in these sweeps. Stratosphere bombing by Flying Fortresses was also tried, Aug.-Sept. 1941, but results at that stage did not justify the loss of such highly trained crews. A still more spectacular daylight raid than those above mentioned was that made by Lancasters on Oct. 24, 1942, on Milan (1350 m.) with fighter escort over only the first part of the outward journey. About this time an important influence on the issue of air warfare was the appearance of the Ger. Focke-Wulf 190, a fighter with a very high rate of climb. When they appeared in 1942 over N. France and the Low Countries the Brit. fighter-pilots met with a much more difficult task than in 1941 against the Messerschmitt 109 E and 109 F. But on June 23, 1942, Brit. bombers wrecked the Focke-Wulf factory and assembly works at Bremen. In any case the Focke-Wulf 190, despite its top speed of 400 m.p.h. and armament of 4 cannons and 2 machine-guns, was in no way superior to the most developed Spitfires then being made. In the autumn of 1942 Bomber Command introduced the Mosquito bomber, a small twin-engined light bomber. Four of these raided Oslo, Sept. 25, 1942, in daylight, on the occasion of a Quisling meeting there.

*Technique of Concentrated Attacks.*—As implied above, Brit. bombing policy changed from night-long visitations to

much larger and extremely concentrated attacks. The new technique of sharp, short overwhelming assault was tried out by the R.A.F. on Kassel on Sept. 8, 1941, but the force employed was under 100 machines. The new and almost revolutionary development in the 1000-bomber raids on Cologne and Essen was their brevity in relation to their mass, the whole attack being over before the defences could adjust themselves to meet it. An equally strong attack on Bremen, July 2, 1942, was concentrated into half an hour. There were soon to be in that year and later, innumerable further illustrations of the damaging effectiveness of these highly concentrated massed raids—blanket attacks leaving nothing untouched within a wide perimeter and overwhelming (as at Dusseldorf, July 31, 1942, and Kiel, Oct. 13, 1942) both guns and searchlights. Losses of heavy bombers were, however, severe, and according to Lord Sholto Douglas, Air Chief Marshal, a casualty rate of 10 per cent would be a deterrent which no air force could endure. The Gers. broke off their night-bombing when their losses rose above that percentage; Brit. losses, even when, as e.g. against Berlin in 1943, they amounted to 58 machines, were not so much as 10 per cent of the number sent. In any case the Brit. losses were certain to increase with the strengthening of the Ger. defences, particularly by the multiplication of Ger. fighter squadrons. This consequence, however, achieved the Brit. strategical plan of assisting the Russian armies and air force by drawing away from the E. front large Ger. forces that would otherwise have assailed the Russians. Moreover, even if the Brit. losses had been more than they were, there was still the mounting mass of Amer. machines and air crews at hand to pursue the strategical bombing campaign. It was on Aug. 21, 1942, that the Amer. Flying Fortresses in a successful encounter in which 25 Focke-Wulf 190's attacked 11 Fortresses, and soon afterwards in raids on the Fr. and Dutch coasts and elsewhere, proved their deadly, if relative immunity. It is true they were escorted by Spitfires, but the Fortresses were generally able to shoot down the enemy fighters and their own losses were often phenomenally low, though it is to be borne in mind that their armament was much heavier than that of the Lancaster or Wellington or any Brit. 4-engined bomber, and consequently they carried a much smaller bomb-load. The Fortress carried, in fact, 13 machine-guns, mostly of large calibre, and their arcs of fire gave protection against attack from all quarters, while their ceiling was higher than that of the Brit. bombers and therefore they were less exposed to anti-aircraft fire. (See Spaight, *Volcano Island*, 1943.)

*Strategic Bombing Policy justified.*—R.A.F. raids on Ger. targets in the first months of the war were delayed by the influence on the Allied Command of Fr. fears of reprisals. But the Brit.

Command at length ignored this unworthy motive and Brit. bombs fell on the Ger. mainland before Ger. bombs fell on Britain (18 Whitley bombers attacked railway installations in W. Germany, May 11, 1940). This boldness in exploiting strategic bombing was justified, for the truth is that Hitler, in spite of the strength of the Luftwaffe, was afraid of the bomber being used as a strategic weapon—whence he masked his fear in a cloak of hypocritical rhetoric on sev. occasions both before and after the start of the war. Thus, in 1935–36 he tried to obtain international agreement on limiting bombing to attacks within the boundaries of battle zones. This, superficially, seemed to be inspired by humanitarian motives, but, had it been adopted, it would not have saved from bombing Warsaw, Rotterdam, or Belgrade, but it would have protected the Ruhr, the Rhineland, and other centres of Ger. industry. The Ger. Command planned a war of mass attack, a war which demanded an uninterrupted flow of material to the battle fronts; hence the Ger. fear of the long range bomber. Furthermore, the battle-fronts, according to the calculation of the Ger. general staff, were always to be outside the frontiers of the Reich. Seen against this background the 'humanitarian' plans of Hitler to outlaw strategic bombing assume their true and ugly shape. But they were the kind of astute propagandist plea which prevailed with those arm-chair critics who, even in Britain, protested against what they called the bombing of civilians, by which term they defined the strategic bombing offensive of the allied air forces. But, in fact, the bomber is a primary instrument for the repression of aggression and would seem to be the only weapon that can, in the long run, destroy war; for it can smother and stifle war at source, and this was the policy of the Allies in their great bombing raids of 1943–44.

It is a truism that the newer the weapon the more rapid is likely to be its development in the course of a great war in which the combatants possess the resources needed to expand it. Fortunately the Allies possessed the greater resources and they did not hesitate to develop independent or strategic bombing. By 1943–44 there was a great development in day bombing; this was carried out on different lines by the Brit. and Amers.—the Brit. by surprise raids with low-flying aircraft, the fast long-range Lancasters; the Amers. by means of 'precision' bombing from high altitudes by Flying Fortresses and Liberators. Each method had its advantages. The Brit. aircraft carried the heavier bomb-load and was on that account more economical. The Amer., armed with a dozen large-calibre machine-guns, with a range equal to the cannon of the Ger. fighters, had a much greater power of self-defence. The most serious handicap for the low-flying bomber was a first-class system of observation and intelligence, the factor which so greatly influenced the

battle of Britain. Hence the Gers. experimented in greater altitudes so as to avoid the fighter and they produced the Junkers 86P which was capable of reaching a height of over 40,000 ft. They also introduced the barbarous 'tip-and-run' raid directed against non-military targets, which required counter-measures quite different from those employed against any other form of attack. In night-bombing the chief development was in the size of the high explosive bomb and the more deadly effectiveness of incendiaries.

After much experience of night-bombing against Germany it was generally agreed among the Allies that the offensive was necessary, but that the results of bombing alone were indeterminate and incomplete. Strategic bombing, in fact, must be driven home by other action—a lesson soon learned by the Jap. in the Pacific. Moreover, it was also realised that a bombing offensive fails in moral effect as well as material, if it be at all relaxed. Hence the Allies increased the weight of their attacks in spite of the worst difficulties and, with their expanding resources, they were favourably situated for carrying out their settled air policy.

An obvious immediate justification for the policy of strategic bombing, intensified by the Allies in 1943-41, was the necessity for destroying enemy fighter plants. Fighters had destroyed many allied bombers and, with greater concentration in the Reich on the production of fighters as against bombers, it was imperative to hunt out and bomb the Ger. fighter plants. This was so effectively done that production fell and the strain on the fighters of the Luftwaffe from this cause and from the wide range of their commitments, soon became noticeable in 1944. The intensification of the allied bombing offensive in the last weeks of 1943 and through the early months of 1944 at length forced on the Luftwaffe the dilemma of either coming to grips with the bombers and suffering great losses—a dangerous risk in view of the then-impending invasion of W. Europe—or of declining combat and leaving Ger. industry virtually undefended.

*All-out Allied Air Offensive against Ger. Fighter Factories. Day and Night Attacks on Berlin. Air Force's Co-operation in the Invasion of Normandy. Super Flying Fortresses.*—The week of Feb. 20-26, 1944, which saw the beginning of the 'all-out' allied air offensive against Ger. fighter factories by heavy bombers from bases in both Britain and Italy, marked a decisive battle of hist., for it changed the course of the air war. From that time the Luftwaffe, converted to a defensive air force, was no longer effective in that capacity. Though still potent, it could no longer challenge the Anglo-Amer. aircraft anywhere and everywhere they flew over Ger.-held ter. From that week the Luftwaffe rose to battle only when it believed it had local superiority or when high-priority targets were under attack. But the great air offensive did not end there, and Berlin was the next

great target to come under night and day attack. Oil targets had high priority on the bombing lists of the 8th and 15th Air Forces and there were many other tasks that had to be carried out. Then came the climax—D Day for the invasion of Europe. As the time for the Normandy landings approached the allied air forces switched their main effort from Ger. oil plants and aircraft factories to railways and bridges. R.A.F. Coastal Command made new dispositions to meet the potential threat to the allied sea armada from Ger. U-boats and E-boats based on Fr. ports; defensive fighters took special precautions against reconnaissance aircraft; and 'intruder' planes destroyed as many as possible of the Ger. radio-location stations in N. France. On D Day the allied forces' 'sea-ground' services struck at the most vital target of all—the overland route to Berlin. Yet the Luftwaffe failed to appear. The R.A.F. and the Amer. air force had made it impossible. Just before allied troops stormed the beaches of Normandy, Amer. heavy bombers and large formations of R.A.F. heavy bombers joined with allied naval forces to smash at beach defences. A few small motor launches, equipped with lights and radio beacons to guide the airborne troops, took up their positions in the Channel. The airborne troops, operating behind enemy lines, disrupted communications, seized cross roads, and cut railway lines. The allied air forces bombed bridges over the Loire and the Seine to seal off the Normandy and Brittany battle areas from the rest of France. Largely because of this the enemy was unable to bring up reinforcements to the front. Gen. Patton's lightning drive through France in 1944 was made possible by the tactical support of the air forces, whose fighters and light bombers covered his otherwise unprotected right flank. Again, the incessant battering from the air of flying-bomb launching sites in N. France reduced the weight of the flying-bomb attacks on Britain to one-quarter of what they would have been. The operations of the 15th Air Force heavy bombers based in Italy were directed mainly against Germany's oil installations, but it was this force that was able to give most direct support to the Russians, who had no strategic air force of their own. The advent of the giant Super-Fortress opened up a new chapter in the hist. of air war. Many difficulties had to be overcome before these great machines could go into operation. But in Aug. 1944 they began the series of attacks that were destined to bring the war to the Jap. homeland. See further under PACIFIC CAMPAIGNS IN SECOND WORLD WAR.

*Air Operations in the Second Battle of the Ruhr.*—The great strength of the Brit.-Amer. air forces in 1945 was shown in the cumulative force of their attacks on the Ger. defence and concentration areas on the farther bank of the Rhine in Mar. 1945. Battles did not cease when the ground forces came to a halt or began to re-form before a fresh obstacle. They continued so long as the

air forces were able to maintain the pressure and develop a planned offensive. Air warfare played a prominent part in the isolation of the Ruhr and of N. Holland through its interdiction of road and rail communication. Immense new bombs, nearly 10 tons in weight, produced an effect which bore e.g. no relation to anything that had ever been experienced in Britain. Allied air sorties were now made, not with 100 or 200 aircraft, but with 4000 or 5000. The development of bombing sealed the fate of the Ruhr. Early in 1945, every one of the 6 main approaches to that valley was cut by air bombing and, by the same agency, the Dortmund-Ems canal was drained dry. With almost unlimited foreign labour the Gers. effected the speediest repairs, but all to no purpose against ever-mounting attacks. The 1941-42 attacks on the Ruhr were minor affairs judged by 1944-45 standards and the approach to the Ruhr presented peculiar difficulties in those earlier years: visibility was nearly always bad; anti-aircraft fire was excessively heavy; and very powerful searchlights were employed to dazzle the pilots. Probably very little of the serious destruction found in 1945 was wrought in that early period.

*Technique of the 'Pathfinder' and 'Master-bomber'.*—But in Sept. 1942 the 'pathfinder' technique was introduced. The basic principle of this was the employment of flares to light up the target. There were 3 successive phases of flare-dropping during a raid: first, a few aircraft flew ahead of the main body to drop flares to illuminate the general target area; a second wave of raiders dropped further flares over a more concentrated region; then the bombers dropped pink incendiaries over particular targets. That was the method of attack during the winter of 1942 and it represented a general improvement of 20 to 30 per cent in damage. It was then that the Gers. began to develop their counter-measures in the way of dummy fires in open country to distract the allied bombers. They also set a network of electric-light globes close to the ground, and by flicking these on suddenly, in combination with arc lamps, gave an effective impression of falling bombs. They also constructed dummy buildings filled with combustibles and set these on fire when the alarms announced the approach of allied aircraft. But these devices had only a short period of success, for the allied air command developed a new technique, that of the master-bomber. The master-bomber and deputy master-bomber, flying in Lancasters, would arrive over the target 15 min. ahead of the main body, and drop a 250-lb. or 500-lb. bomb, which, exploding 300 ft. above ground, would emit a series of flares well above the level that could be reached by the normal 'fake conflagrations.' If the ground was not visible the process known as sky-marking would be adopted, and flares dropped over the target above cloud

level. The main body would then bomb the area indicated by these flares. Further help was given by an invention known as 'magic eye,' which made visibility possible through heavy cloud. Again, different-coloured flares were dropped by the master-bomber to show where a particular target had been obliterated and to direct following bombers where to select a new target instead of wasting bombs on obliterated targets. In the raids of 4 successive nights Krupps' works at Essen were practically laid flat. Twice the Gers. rebuilt them; a third time the bombers came, and in Mar. 1945 they still remained a disused wreck. Shattered to their foundation, the 14 prin. tns. of the Ruhr and of the neighbouring valley of the Wupper were found in 1945 by the advancing allied armies to be mere ruins of rubble and ashes—ruins that spoke volumes for the devastating effect of area-bombing by 41,600 aircraft of Bomber Command. It is estimated that, altogether, Bomber Command by the end of Mar. 1945 had rained down 143,000 tons of bombs on these cities; while intervening and other targets in the area received 39,000 tons dropped by another 9,600 machines of the same command. This near obliteration of the Ruhr's war machinery, actual or potential, greatly influenced the later classical double envelopment by the land forces, for the trail of destruction stretching over silenced engineering works, shattered armament factories, twisted railway tracks, bomb-torn roads, corroding oil-pits, wrecked pit-head machinery, and bomb-pitted streets, left the impression that the battle for the industrial Ruhr was as good as won months before the end of the war in May 1945.

*See further under BRITAIN, BATTLE OF; BOMBER COMMAND, and NAVAL OPERATIONS IN SECOND WORLD WAR.*

*Aerodoloscope*, a species of semaphore form publicly signalling changes in barometric readings.

*Aerodrome*, alternatively airfield or, if supplied with customs and immigration facilities, airport, a place at which aircraft land and take off. Varies in type from flat grass-covered surface allowing take-off runs of 600 yds. to great open spaces crossed by concrete runways up to 3000 yds. in length and 100 yds. in width and surrounded by concrete tracks for taxi-ing. Most As. have hangars for housing aircraft. Bigger types have buildings to house control organization, administrative services, workshops and offices of operating companies. Chief A. in London area is at Heathrow, near Staines. When finished it will consist of 9 runways arranged in form of 3 interlocking triangles, 3 of runways being 3000 yds. long, and the others 2000 yds. These should allow 240 aircraft to be handled per hour in daylight. This airport is intended for inter-continental traffic. Second inter-continental airport in Britain is at Prestwick, near Ayr, Scotland. London has another airport at Northolt for European traffic.



There are some 130 As. in the United Kingdom; 52 of these are owned and operated by Ministry of Civil Aviation. Landing charges are made at every A. and are graduated according to loaded weight of aeroplane. Many of smaller As. have club-houses; bigger As. have public waiting-rooms and refreshment-rooms for passengers and also public enclosures for spectators. Control organization is responsible for regulating air traffic within airport control zone which extends from radius of 9 m. at smaller airports to radius of 35 m. at bigger. It is also responsible for providing runway, boundary and taxi-track lights, and for aids to landing in poor visibility. These include radio and radar beacons which indicate on instruments in the aircraft the approach path an aeroplane must follow to arrive at the end of the runway. Alternative system allows track of incoming aeroplane to be followed by radar and approach instructions to be given by radio to pilot. Control also instructs pilots what heights and courses to fly within control zone. Major As. provide pilots with bearings, 'fixes,' and special meteorological information on request. One civil and one R.A.F. A. in Britain have fog-dispersal apparatus installed on each side of 1 runway for use in emergency. Every A. in commercial use has a neon beacon which flashes the 2-letter call-sign of the A. at night. Most As. are some miles from the cities they serve and only 1 in the United Kingdom (Gatwick) has its own railway station. Communication is generally by road. The development of rail links has been considered desirable for main airports and these will probably be provided unless, in the meantime, helicopter services should make them unnecessary.

Aircraft carriers (*q.v.*) are floating As. for aeroplanes and are important units of all the chief navies of the world. They have a speed of over 30 knots and flying decks of nearly 1000 ft. in length. Machines are transferred very speedily to the deck from the hangars below by hydraulic lifts. In taking off, the machine rises well above the deck before reaching the forward end. Landing is not so easy an operation. It is done over the stern of the aircraft carrier and if the wind and aircraft-carrier speed are together about equal to the landing-speed of the aeroplane, the aircraft carrier, from the pilot's standpoint, is scarcely moving and there is little if any run after alighting.

Airships, too, have acted as aerial As., and the ill-fated Amer. dirigible *Akron* was large enough to house 5 aeroplanes in a special compartment. The aeroplanes, suspended from trapezes, were lowered, detached themselves and flew off and, at the end of their flight, could attach themselves to the trapeze and be hoisted aboard the airship again.

The name aerodrome was also given by Prof. Samuel Pierpont Langley (*q.v.*) to the steam-driven model of a double monoplane which he built in order to prove that the power required to lift a

machine into the air was much less than commonly supposed by scientists. His machine, which was most skilfully constructed, was launched in 1896 from a boat in the Potomac R. and flew for half a m. at 20 m.p.h., thus proving that 1 h.p. could maintain at least 20 lb. in the air.

**Aerodynamics.** The science of A. consists of the study of the forces which air can exert on a body, owing either to the motion of the body through the air or to the motion of the air past the body. It finds its most important application in the design and construction of aircraft, and the word A. is now generally used to refer to the mechanics of flight. In this sense the subject deals with: (a) the origin and nature of the air forces experienced by an aircraft, and (b) the effect of these forces on the behaviour of the aircraft. A knowledge of A. is therefore essential for the determination of such important items as the strength of the structure, the capability of the aircraft to carry its load, and the degree of stability and controllability.

In so far as A. deals with (a) above, it cannot be regarded as an exact science, for many of the air forces acting on an aircraft are not directly calculable from first principles, but have to be determined by experiment. Most of the experimental work is carried out on models, and in this work advantage is taken of the fact that the air forces are the same, whether the model is moving through still air or is stationary and the air is flowing past it, provided that the relative speed is the same in each case. The model is therefore kept at rest and mounted in a long box of circular or square cross section, called a wind channel or wind tunnel, and the air is driven through the channel by the action of a propeller or an airscrew driven by an electric motor. In this way the air forces can be simply and accurately measured.

The fundamental law of A. states that, for all geometrically similar bodies inclined at the same angle to the air stream, the air force experienced may be taken with good accuracy to be directly proportional to the density of the air, the square of some linear dimension, and the square of the speed; and it is by the use of this law that data obtained from model experiments can be applied to the full-scale aircraft. Suppose, for instance, the full-scale resistance at 100 m.p.h. is to be deduced from the measured resistance of a  $\frac{1}{4}$ -scale model at 50 m.p.h., the air density being the same in each case. Then, since every dimension of the full-scale aircraft is 10 times the corresponding dimension of the model, the measured resistance must be multiplied by  $10^3$  or 100 to allow for scale. Again, since the full-scale speed is double the model speed, the measured resistance must also be multiplied by  $2^2$  or 4. Thus the full-scale resistance at 100 m.p.h. is 400 times that of the model at 50 m.p.h.

Near the ground density variation is negligible, but the decrease of density at height is most important. For instance,

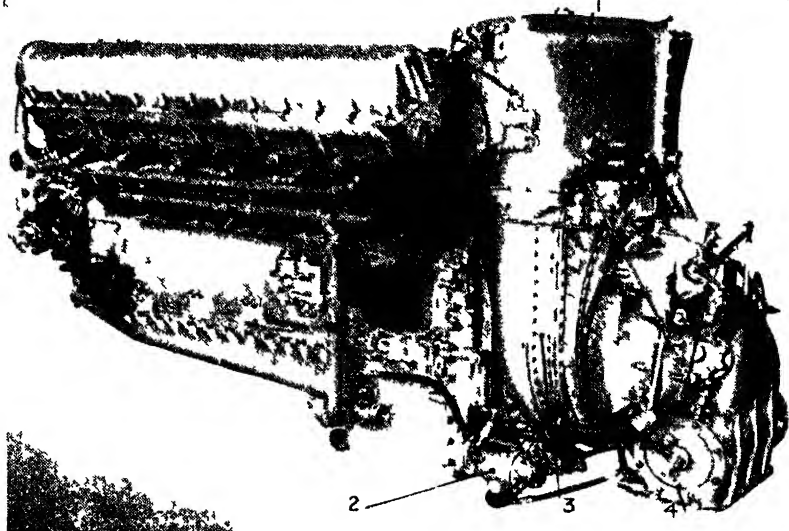


FIG 1 LIQUID COOLED PISTON VALVE VEE

Rel 1 05 cc ( rison 130 with 3 speed supercharger Weight 2100 lb

Maximum powers  
 2400 bhp at 5000 ft  
 2250 bhp at 14 500 ft,  
 2050 bhp at 27 000 ft

- 1 Intercooler
- 2 Fuel metering pump re-  
plating carburettor
- 3 Three speed supercharger
- 4 Air intake and throttle

FIG 2

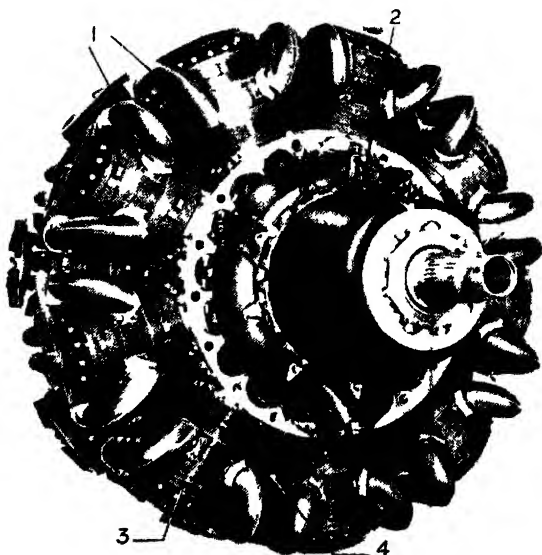
AIR COOLED SLIPPER  
 VALVE RADIAL

Bristol Centaurus VI 2  
 speed supercharger

Weight 21 95 lb  
 Diameter 55 3 in

Maximum powers 2520  
 bhp at 1000 ft at  
 2700 rpm lower 2225  
 bhp at 11 000 ft at  
 2700 rpm

- 1 Exhaust pipes
- 2 Epicyclic gearbox
- 3 Finned sleeve valve  
cylinder
- 4 Intercylinder baffles



the density at 22,000 ft. is only one-half that at ground level, and so the resistance at this height is halved also. It might be thought from this that aeroplane performance is better at height than near the ground, whereas, in point of fact, exactly the reverse is the case, owing to the introduction of sev. other factors, the primary one of which is the loss of engine power due to the density reduction.

Although A. still depends to a great extent upon experiment, the mathematical theory of airflow has not been neglected, and modern research has thrown considerable light on the true working conditions of such important aircraft components as airscrews and aeroplane wings. Applied A. is now, in fact, a blend of theory and experiment, and it is possible to predict most air forces with considerable accuracy. Clearly, when all the air forces on an aircraft are known, aerodynamics fulfils its function with regard to (b) above by the application of the more exact principles of ordinary mechanics. (See also AEROPLANE.) See N. A. V. Piercy, *Aerodynamics*, 1944.

**Aero-Engines.** There are three main types: reciprocating (Otto or Diesel cycles, i.e. normal I.C. engine with electric ignition, or solid injection I.C. engine, q.v.); turbine; and rocket—the 2 latter appearing during the Second World War.

The essential requirement is high power for low weight. In the reciprocating internal combustion engine this is achieved by attention to detail design (every part being reduced to the least possible weight consistent with strength by the use of special materials and the careful machining of components) and by supercharging to obtain the highest possible power per cylinder vol. At the end of the First World War, dry weight was approximately 5 lb./h.p., now it is only about 1 lb./h.p. Carburetion is complicated by the small amount of oxygen in the rarified air at heights, which reduces the quantity of fuel that can be used and consequently the power of the engine. On small engines, i.e. up to 200 h.p., the effect on the fuel/air ratio is counteracted by an altitude control which reduces the fuel delivered at a given throttle setting; but this method only keeps the engine running, it does not maintain the power output at its sea-level figure. To maintain power superchargers (i.e. compressors designed to deliver air at more than atmospheric pressure to the cylinders, thereby increasing the effective capacity and power) are fitted. These are of 2 types; gear-driven and exhaust-driven, by passing the waste gases through a turbine. In both cases centrifugal fans are used (i.e. fans that revolve at high speed, 20,000 r.p.m., sucking in air near the shaft and throwing it out at increased pressure at the periphery), since they are the most compact form of compressor. Originally, fixed gear ratios were used, but with increased operating heights 2 and then 3 gears were employed. In Great Britain an automatic boost control is fitted to the

carburettor (q.v.) so that the engine is not damaged by opening the throttle too much, and obtaining too great a power at a given altitude. The automatic boost control is a device, operated initially by a variant of the ordinary barometer, which overrides the normal throttle in such a way that the maximum quantity of fuel admitted at any air pressure will not cause an explosion in the cylinders that will overload them. Freezing is another serious problem which has to be overcome by having alternative heated air-intakes, by using injection carburetors (U.S. method adopted in Great

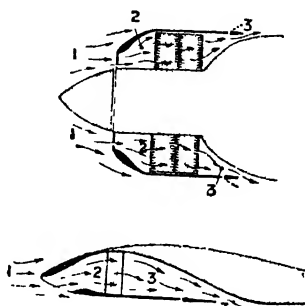
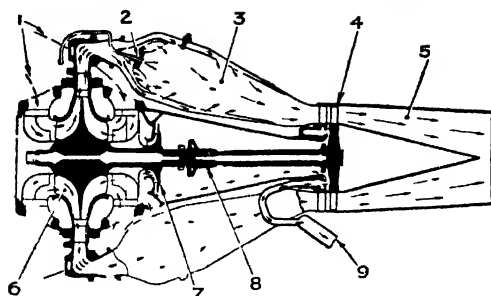


FIG. 3. DIAGRAMMATIC SKETCHES OF THE PRINCIPLES OF PRESSURE COOLING APPLIED TO AN AIR-COOLED RADIAL ENGINE AND A DUCTED RADIATOR

1. Air enters small opening in cowling at high speed.
2. Air expands inside cowling; speed drops and pressure rises.
3. Air heated by cooling engine expands further and is ejected through small outlet at high speed. Volume of air is controlled by varying size of outlet.

Britain about 1943), where the fuel is squirted into the induction manifold instead of being sucked off a jet in a venturi, or by direct injection through nozzles in each cylinder (Ger. system). Owing to high power (largest piston engine 3,500 h.p.) cooling is important. Air-cooled engines dissipate heat through fins on the cylinders and are assisted by ducted cowlings (Fig. 3) which pass air round the cylinders without increasing drag. Liquid-cooled engines use a glycol/water mixture with a high boiling point and the radiators are mounted in ducts (Fig. 3) where the air is passed through at low pressure and then ejected through a narrow outlet—giving thrust, not drag, at high speed.

Reciprocating A. E. (R.E.) can be classified as follows: *Otto cycle*: air-cooled radials, 3, 5, 7, 9, or combinations up to 4 rows of 7 cylinders: power 50–3,500 h.p. (Fig. 2); air-cooled in-line or vee, 4, 6, 12 cylinders: power 50–500 h.p.; air-cooled horizontally opposed 2, 4, 6 cylinders: power 50–200 h.p.; liquid-cooled vee,



- 1 Intake air
- 2 Fuel nozzle
- 3 Combustion chamber
- 4 Turbine wheel
- 5 Jet pipe
- 6 Centrifugal compressor
- 7 Turbine cooling air fan
- 8 Main shaft
- 9 Turbine cooling air outlet

Weight 1600 lb

Diameter 49.5 in

Length 97 in

Maximum power Static  
thrust 5000 lb at 12,400  
rpm at sea level

- 1 Jet pipe
- 2 Combustion chamber
- 3 } Air intakes
- 4 }
- 5 Accessories
- 6 Turbine
- 7 Fuel gallery

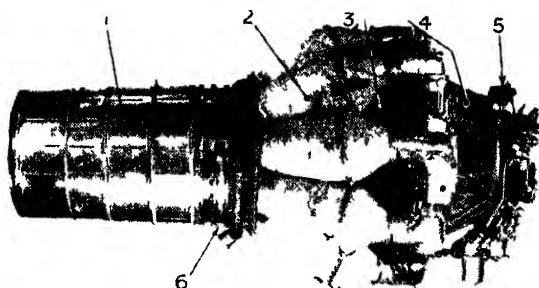
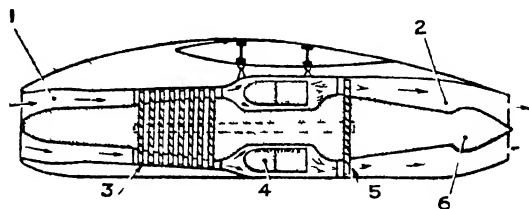


FIG. 4. WHITTLE J11 JET ENGINE  
Rolls Royce Acme I with double sided centrifugal compressor



- 1 Air intake
- 2 Hot air exit
- 3 Light stage compressor
- 4 Ring of burners
- 5 Turbine
- 6 Outlet control

Weight 1350 lb

Diameter 27 in

Length 143 in

Maximum power Static  
thrust 1700 lb at 9500  
rpm at sea level

- 1 Oil tank and cooler
- 2 Accessories
- 3 Fuel gallery
- 4 Turbine
- 5 Outlet control
- 6 Intake duct
- 7 Compressor stage
- 8 Combustion chamber
- 9 Jet pipe

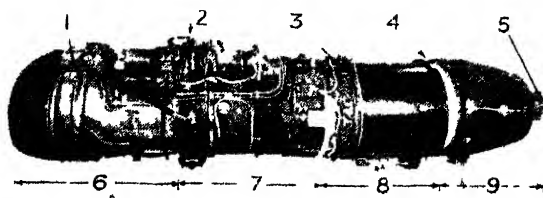


FIG. 5. AXIAL JET ENGINE  
BMW 003 E-1 with straight through combustion

12 cylinders: power 1000-3000 h.p. (Fig. 1); liquid-cooled H (Napier), 2 sets of 12 horizontally opposed cylinders driving separate crankshafts geared together; power 3000 h.p. *Diesel cycle*: not generally successful owing to weight, but low fuel consumption an advantage for long range; only really successful example Ger. Junko 205 liquid-cooled, vertically opposed 2-stroke.

expanded by burning fuel with it and ejected at high speed. Fuel/air ratio is adjusted for altitude by a capsule-operated barostat—this is a barometric device, similar to a boost control, that adjusts the fuel/air mixture to the correct combustion proportions for the varying air densities at different heights. Turbine engines have a very simple cycle and the torque is small owing to the low weight of

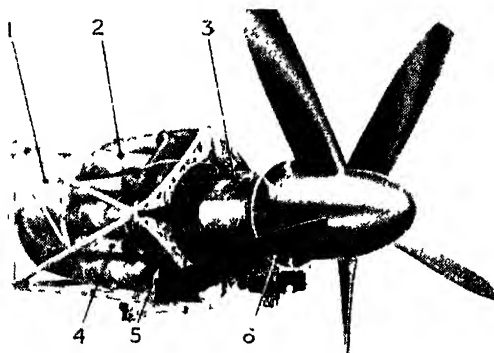


FIG. 6.

## AIRSCREW-JET ENGINE

Bristol Theseus I., with combined axial and centrifugal compressor and dual turbine for driving the compressor and airscrew

Weight 2500 lb.

Maximum power: 1950 h.p. and 500 lb. static thrust at 6000 r.p.m.

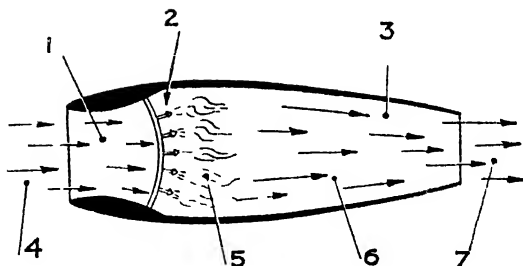
1. Jet outlet
2. Combustion chambers
3. Casing of 9-stage axial compressor
4. Air delivery trunks
5. Centrifugal compressor
6. Annular air intake round reduction gear

FIG. 7.

## PRINCIPLE OF ATHODYD

The basic principle is the same as Figs. 4, 5. Air taken in at the front is compressed, then expanded by burning fuel with it and ejected at high speed.

1. Venturi
2. Fuel nozzles
3. Short jet pipe
4. Air entering at high speed
5. Burning gases
6. Expanded hot gases
7. High velocity jet



The *gas turbine engine* (T.E.) has only been practicable since 1939, its use depending largely on the development of heat-resisting alloys for the turbine. The *gas turbine* differs from the steam turbine (*q.v.*) at present, since it consists of a single or at most 3 turbine wheels instead of the sequence of wheels (or drum) that are used in the steam design. This is because it is only necessary to extract sufficient energy from the combustion gases to drive the air compressor, in fact it is the residual energy left in the fast-flowing gases which provides the thrust, or power of the engine. There are 2 main principles: that of Sir Frank Whittle with a centrifugal compressor (Fig. 4), and the axial compressor type (Fig. 5). The basic principle of each is the same, viz. air taken in at the front is compressed, then

revolving parts, and the whole unit is very light for its power—this cannot be easily compared with R.E. since it is measured as lb. thrust, not as h.p. T.E. delivers its power by the jet of heated air expelled at the rear, the thrust being the reaction to the mass of air ejected. Efficiency depends on ratio of forward motion of engine to backward flow of jet, 100 per cent being when the speeds are equal. This engine is most effective at high speeds (500 m.p.h. plus), and at lower speeds it is more efficient to convert the s.h.p. of the turbine to thrust by gearing it to an airscrew. In this case the greater part of the energy in the gases is usually absorbed by the turbine. It can be converted into airscrew thrust by gearing direct from the compressor shaft, or, more efficiently, by taking the power from a

separate turbine stage (Fig. 6). Another arrangement is to combine a very simple 2-stroke engine for driving the compressor with the jet effect of heated and compressed air (Ricardo theory). T.E.s are notable for running at high speeds, 10,000-15,000 r.p.m. as against the 3000 r.p.m. of a R.E.; but since the rotating masses are light, stresses are lower than in R.E. and the resulting engine is very light. Simplest jet engines are impulse ducts (Ger. V-1), or athodyds (Fig. 7), consisting of a form of venturi in which fuel is burnt with the air taken in the front by forward speed, the gas is expanded by heating and is ejected with increased energy. This system requires the engine to be given initial forward speed to provide the initial air compression before the cycle comes into operation—at very high speeds it is efficient. Main disadvantage of all jet engines is high fuel consumption; due mainly to the high powers and to inefficient operation of the cycle at cruising and idling speeds. This difficulty is being overcome rapidly by refinements in design.

*Rocket engines* were developed by Germany in the Second World War, and are driven by liquid fuels. Liquid oxygen and liquid hydrogen are pumped into a combustion chamber where they form a very powerful propellant. Rockets give very high powers, but only for short periods, because the fuel consumption is large, since the engine provides its own oxygen instead of using that in the air—this latter fact makes them independent of the earth's atmosphere. See also *Jet Propulsion*. See A. W. Judge, *Aircraft Engines*, vol. i, 1945; vol. ii, 1947; R. T. Sawyer, *The Modern Gas Turbine*, 1946; R. A. Beaumont, *Aero-Engines for Students, including Gas Turbines*, 1947.

**Aerolite**, a mass of stony or metallic matter known to have fallen to the surface of the earth from beyond the region of the atmosphere. Sometimes a distinction is drawn between As. and meteorites, the latter being taken as the generic term and the former applied to those masses which are composed of stony matter only. Other meteorites contain a large proportion of metallic iron alloyed with nickel; these, however, are of comparatively rare occurrence.

At different periods during the year, particularly in the month of Nov., showers of 'shooting stars' or meteors are to be observed. They consist of planetary bodies which have come within the earth's gravitational influence, and are heated to incandescence by friction with the earth's atmosphere. They may be divided into two classes, shooting stars and fireballs. The former usually appear as bright streaks rapidly drawn across the sky, and gradually fading away; the latter are distinguished by a greater radiance and a slower motion. They are sometimes accompanied by loud detonations, and as stones have been sometimes seen to fall soon afterwards, it appears that fireballs are meteors that actually reach the earth, or at any rate arrive to within a short distance of it.

It is estimated that meteors enter the atmosphere with a velocity up to 50 m. per sec. In most cases the substance is dissipated before the body reaches the ground; if it survives to the lower and denser parts of the atmosphere, the velocity is considerably reduced, thus meteorites examined shortly after their fall are found to possess no very high temp. In appearance they are irregularly-shaped fragments covered with a crust or glaze, which is the result of their previous incandescence. They consist of substances which are to be found in the earth's crust, and at least two-thirds of the earth's elements are represented. No trace of organic matter has been discovered, so that they throw no light on the problem of the existence of life in the rest of the planetary system.

Meteors were naturally superstitiously regarded by the ancients, and the stones were venerated as visitants from heaven. The image of Diana of the Ephesians 'which fell down from Jupiter' (Acts xix. 35), was probably a conical A.

Masses of meteoric stone have been found weighing as much as 50 tons, but the largest actually seen to fall came down in Hungary in 1866 and weighed 547 lb. A collection of As. may be seen at the Natural Hist. Museum in S. Kensington.

**Aeronautics**. This science may be divided into 2 parts, acrostation, that is, flight by means of something lighter than the air; secondly, aviation, that is, artificial flight, either by means of machines, or else as birds by means of artificial wings. Historically, aviation is the older of the two, since, if we go back to mythology, we find the stories of Pegasus and later of Daedalus. Further, the monsters of Assyrian and Egyptian mythology give us examples of beasts that were supposed to be able to fly. During the Middle Ages and down until the beginning of the eighteenth century we get story after story of men fitted with artificial wings, either making or attempting to make flights. We have, for example, the story given us by William Dunbar, the poet, of how an It. magician gave an exhibition of flying for the edification of James IV. He purposed to fly from the walls of Stirling Castle, armed with wings which were composed chiefly of birds' feathers. Naturally he failed, being fortunate enough to escape with only a broken thigh, his explanation of his failure apparently being that his wings were not made of eagles' feathers, but of some of the lesser birds of the sky. We have further references to the art of flying in Leonardo da Vinci and in Francis Bacon, and later still we find an attempt to prove that flight by means of man's own strength was impossible, this being argued chiefly from a detailed examination of the muscular strength of birds. The first science, however, to be more or less successful was acrostation. In the classics we get one reference which gives us an idea that the later method of acrostation by means of hot air was known to the ancients, this reference being to the flying dove of Achytas, but for a

further development of this method we have to come down to medieval times. Roger Bacon (1214-94) speaks of attempting by means of a hollow globe and liquid fire to solve the problem, while in the following century he is followed by Albert of Saxony (fl. 1366-90), who also spoke of aerostation by means of fire in a light sphere. During the sixteenth and seventeenth centuries, however, we get a number of fantastic ideas put forward. Laurus, for example, spoke of swans' eggs filled with sulphur or mercury being drawn up to the sun, while in the *Histoire comique* of Cyrano de Bergerac vessels filled with morning dew are supposed to have carried a man into the middle of the atmosphere. But also in the seventeenth century we get the beginning of much better ideas. Francis Lana came forward in 1670 with an idea which, though practically unserviceable, was nevertheless a great advance on previous ideas. He proposed that 4 hollow balls should be taken, made of brass of the very slightest thickness, and that these should be exhausted of air. To them should be attached a small boat and sail, and in that way a balloon would be contrived which could carry a man. The idea was not feasible, since the globes, made of brass only 1-250th of an in. thick, would have collapsed by reason of their own weight. But although Lana saw this difficulty, he argued that their shape would prevent that. It is not until the next century that we get the real balloon invented.

The beginning of the development of the balloon was the work of 2 brothers, Joseph and Etienne Montgolfier, who were the sons of a paper manufacturer of Annonay. They seem to have been influenced by Cavendish's experiments relating to the weight of hydrogen, and by Priestley's paper on 'Different Kinds of Air.' From their own observation of the clouds they came to the conclusion that a paper bag filled with 'substance of a cloud-like nature' would float in the atmosphere. They experimented with paper bags over fires and found that they floated. This determined them to have a public exhibition at Annonay. On June 5, 1783, they inflated a bag, made probably of linen, though some authorities say that it was made of paper, over a fire of chopped straw. This balloon rose to the height of about 1½ m. before it cooled sufficiently to descend about 10 min. after its ascent. The Montgolfiers, however, came to the conclusion that the ascent was due to the smoke of the fire, and did not realise that it was really due to the lightness of the heated air. This experiment attracted much attention, and steps were taken for the sending up of a hydrogen balloon in Paris. The prime movers in this were M. Faujas de Saint-Fond, M. Charles, and 2 brothers named Robert. The balloon was filled with hydrogen made by the action of 500 lb. of sulphuric acid on half a ton of iron filings, and took 4 days to inflate. It was about 13 ft. in diameter, and weighed less than 20 lb.

When liberated it rose to the height of about 3000 ft. and remained in the air for about three-quarters of an hr., and then descended in a field at Gonesse. The 2 types of balloons have usually been differentiated as air balloons and fire balloons, or Robertières and Montgolfières. Following this experiment came another by Montgolfier, who sent up a balloon from Versailles carrying a sheep, a duck, and a cock. These animals descended safely about 8 min. after the ascent. The first man-carrying ascent took place in Oct. 1783, when Pilâtre de Rozier went up in a Montgolfier captive balloon, the inflation again taking place by means of fires of chopped straw which were carried in a brazier suspended under the balloon. In Nov. of the same year the first free ascent was made by Rozier and the Marquis d'Arlandes, who made an ascent in a fire balloon. They journeyed about 5 m. at a height of about 500 ft., descending safely in a field just outside Paris. In Nov. there seems to have been made at Philadelphia the first man-carrying ascent with a hydrogen balloon, 7 days after the ascent of Rozier and d'Arlandes at Paris. Longheed says that a carpenter named James Willcox allowed himself to be persuaded to make the ascent, which was under the auspices of the Philosophical Academy. In Dec. Charles and Robert made an ascent in a free hydrogen balloon of about 27 ft. diameter. They safely accomplished a journey of about 27 m. in just under 2 hrs., when, Robert having got out, Charles made a further journey of about 3 m., rising to the height of about 2 m., and enduring some discomfort from the rapid ascent and the height to which he was carried. To Charles is due the credit for the ideas of a valve and a car suspended from a hoop attached to the balloon by means of silk netting. The first woman to ascend was Madame Thible, who went up from Lyons in 1784.

The development of the hydrogen balloon, however, was due also to the experiments which had already been made by Cavendish, who showed the lightness of hydrogen as compared with the air, and the work of Dr. Black and Tiberius Cavallo. Dr. Black had attempted to cause a calf gut bladder to ascend when inflated with hydrogen, but had failed because of the heaviness of the calf gut; but Tiberius Cavallo had inflated soap bubbles with hydrogen and floated them in the year previous to the first ascents by Montgolfier (1782). The first ascent in Great Britain took place about 5 months after the first Montgolfier ascent in France; the balloon was made by a certain Count Zambecari, being about 10 ft. in diameter and weighing 11 lb. It went up from the artillery ground in Nov. 1783, and descended about 48 m. from London in Sussex, having been in the air about 2½ hrs. At the beginning of the next year (Feb. 1784) a balloon was liberated from Sandwich, and descended in Fr. Flanders; this was the first cross-Channel flight. The real introduction of aerostation

into England, however, was made by Lunardi. He was secretary to the Neapolitan ambas., and in his letters gives a detailed description of the circumstances attending his first flight. His balloon was 33 ft. in diameter, and was visited by about 20,000 people during the time that it was on view at the Lyceum in the Strand. On Sept. 15, 1784, he made an ascent from the artillery ground by himself. A huge concourse of spectators, amongst whom was the Prince of Wales, watched the ascent. Lunardi took with him a dog, a cat, and a pigeon, and his balloon was fitted with oars by which he intended to try to navigate the balloon. One of the oars, however, broke shortly after the beginning of the ascent. He landed first of all at a vill. in Hertfordshire after about 1½ hrs.' travelling, and again continued his journey to Standon near Ware, which he reached after about a further ¼ hr.'s flight. This was the first real ascent in Britain, and attracted an enormous amount of attention. Lunardi became the lion of the moment, he was presented at court, and was received everywhere with extravagant enthusiasm. He made further ascents in Scotland in the following year, during one of which he travelled about 110 m. The first man-carrying cross-Channel voyage was made by Blanchard and Jeffries in Jan. 1785. Blanchard had already in the previous year estab. a reputation as an aeronaut, and by this and succeeding voyages he became known as one of the most famous of aeronauts. The cross-Channel voyage was accompanied by some perils, but was safely negotiated, the descent being made in the forest of Guines. In the same year another attempt was made to perform this same feat by Rozier and Romain. The balloon used on this occasion was a combination of a Montgolfiere and a Robertière. The actual ascent was made in safety, but the balloon having risen burst into flames, and the aeronauts were both killed. During the century which followed balloons were greatly developed, and were used for scientific and military purposes. Long voyages were undertaken and immense balloons were constructed for the purpose of carrying out various projects—e.g. the great Nassau balloon journey in 1836 from London to Weilburg, a distance of nearly 500 m., in about 18 hrs. In 1863 Nadar constructed what was called *Le Grand*, a very ambitious vessel, which was constructed for the purpose of making long voyages. The car of this balloon was exhibited at the Crystal Palace during the years 1863-64.

During the nineteenth century a number of long voyages were either made or contemplated, the 2 longest made being voyages of over 1000 m. in 1859 in America, and in 1900 from Paris to Korostyshev, a distance of 1193 m. In 1897 an attempt was made to discover the N. Pole from Spitzbergen by balloon, but Andrée and his 2 companions perished, no traces of them being found until over 30 years later. (See ANDRÉE.)

The development of the balloon soon brought with it the possibility of scientific research, and various experiments were made during the early part of the nineteenth century. Most of the experiments were not at first carried out very carefully, and the results did not come up to expectations. Two ascents by the scientist Gay-Lussac, however, gave some useful information regarding the upper air and the effect, or rather lack of effect, of the upper air on magnetic force. After 1805 the experiments seem to have ceased until the middle of the century. Between 1850 and the end of the century a number of important ascents were made for scientific purposes; the most important of these were the ascents made by Glaisher between 1862 and 1866. Altogether 28 ascents were made, a number being made from Wolverhampton and from Woolwich. The chief problems that these ascents tried to solve were: the height, density, and thickness of clouds, the direction and the rate of the various air currents, the amount of electricity in the air, and the comparison of readings of an aneroid barometer with those of the mercury barometer. The results of the observations were pub. in the Brit. Association reports between 1862 and 1866. A number of extremely high ascents have been made, but these have always been attended with much danger. The highest was made in July 1901, when a height of some distance over 34,500 ft. was reached by 2 aeronauts from Berlin. To obviate the necessity of making these dangerous high ascents, unmanned balloons have been sent up with recording instruments attached that work automatically.

Although it is only from about 1885 that balloon corps were organised by the armies of the various great powers, previous to that time they played an important part in the various campaigns of Europe. From the beginning they had attracted the attention of the military authorities, and we hear of their being used during the wars which followed the Fr. Revolution. In June 1794 balloons were used for the purpose of reconnoitring by the Fr., who were fighting the Austrians, but the idea was not seriously developed, and in fact the ballooning corps of the Fr. were disbanded by Napoleon. But war balloons were used by the Fr. when fighting in Italy, but were at this period in charge of 2 civil aeronauts, there being no ballooning corps. In the Amer. civil war, at least during the beginning of that war, they proved themselves of very considerable value; in fact a small Federal balloon corps was formed during this period. During the siege of Paris they proved of great use in keeping up communications with the outside world, and 64 of them were dispatched between the beginning and end of the siege.

*Dirigible Balloons.*—From the time of the beginning of balloon flights it was recognised that the great problem before aeronauts was to be able to navigate the balloon safely through the air, and to



make it to a very great extent independent of the air currents. The first means of propulsion tried was oars, but although in a calm atmosphere some little success was gained with them, it was recognised that this means could never be really successful. Oars were experimented with at the end of the eighteenth century, but the first attempt to navigate the balloon by means of a small, light engine came over 50 years later, in 1852, the experiment being made by Henri Giffard. Between that time and the end of the century many experiments were made, some of which attained a transient success, and some met with almost instantaneous disaster. In 1897 an experiment by Dr. Wolfert with a small gasoline motor led to the explosion of the airship in mid air and to the death of the aeronauts. From the year 1897 the development of the airship was the special work of the Count Zeppelin. In 1900 he made his first flight with a dirigible balloon which carried 5 men. It was made of aluminium, supported by gas-bags and driven by 2 motors, each about 16 h.p. His first experiment met with some success, but the first Zeppelin airship was succeeded by another in 1905 with greater motor power; this was wrecked and was succeeded by a third which met with great success. This airship carried 11 passengers and attained a speed of about 30 m.p.h. The fourth Zeppelin airship succeeded in travelling about 250 m. in 11 hrs., but was wrecked by a storm in 1908, the wreckage catching fire and completely destroying the ship. In the meantime many other experiments had been carried out, notably by Santos Dumont, who circled the Eiffel Tower in the face of a fresh wind; while in England a number of experiments were carried out by the War Office with dirigible balloons. The most successful voyage was that of the *Nulli Secundus*, which, leaving Farnborough, sailed round St. Paul's to the Crystal Palace, carrying 2 passengers and attaining a speed of about 20 m.p.h. (See also AIRSHIPS; BALLOONS.)

The study of artificial flight can be traced back practically through legendary story to the beginnings of hist. As has already been pointed out, the hist. of aviation is older than that of acrobatic, and during the Middle Ages we get many attempts to produce a workable airship or to imitate the flight of birds by means of artificial wings. Leonardo da Vinci initiated theories concerning flight, and during the latter part of the seventeenth century and the beginning of the eighteenth many theories were advanced and much research made concerning the theory of flight. Much experiment was done with artificial wings and with aerial screws. Amongst the names which may be mentioned in this connection are those of Ronelli, Morey, Pettigrew, and Cayley. To Sir George Cayley is given the credit of being the inventor of the modern aeroplane. Prof. Berlet in his book *The Conquest of the Air* points out that every essential to

successful flight was given in the airship invented by Sir George Cayley. 'In fact everything was there in Sir George Cayley's idea—the wings forming an oblique sail, the empennage, the spindle forms to diminish resistance, the screw propeller, the explosion motor, the calculation of the centre of thrust, and the demonstration of the fact that displacement takes place towards the front. The author even describes a means of securing automatic stability.' This machine was described by Sir George Cayley in a paper contributed to *Nicholson's Journal* in 1809, and in the following year he produced the apparatus itself—at first without a motor, but later with a motor as well. The invention, however, was not successful, and during the trials the machine met with disaster. The next attempt at aviation that we hear of is in 1813, when Hensons, by a combination of aerial screws and supporting surface, tried to complete a successful machine. The attempt was not a success, although it was followed up in the succeeding years by many other attempts, especially by his partner, Stringfellow. During the years which followed many attempts to solve the problem of aerial flight were made, but none of them met with great success. The difficulties in the way were enormous; the science of aerodynamics had yet to be developed; flight in the air was flight through a substance the laws of which were only dimly beginning to be understood. The science of aerodynamics, which even now is only at its beginning, was developed during the latter part of the nineteenth century by Sir Hiram Maxim, and Prof. Langley, an Amer. physicist. By 1896 the experiments of Langley had been so far successful that he made an aeroplane which, although it did not by its own effort lift itself from the ground, flew for a distance of about half a m. along the Potomac R. Further experiments had in the meantime been carried out by Sir Hiram Maxim and N. C. Ader. The former to a very great extent helped to solve the problem of light motors by producing in 1894 an aeroplane with an engine which weighed not quite 2 lb. per 1 h.p. But in spite of this the aeroplane failed to fly. Ader seems to have been the first inventor to produce a machine which lifted itself from the earth by its own effort. Between 1896 and 1903 he produced 3 machines, none of which was very successful, but which embodied new ideas, and one of which flew for about 350 yds. The first aeroplane flight may be said to have taken place at Satory in 1896, when Ader's machine lifted itself by its own power and flew for the short distance already mentioned. In the meantime experiments were being made with soaring machines and gliders. The chief name to be mentioned in connection with this movement is that of the Berlin engineer, Otto Lillenthal, who, with an arrangement formed on the plan of birds' wings, attempted to imitate their 'soaring flight.' These wings were made of a light framework covered with a light

fabric with 2 rudders in the rear. In the centre of this framework Lilienthal was poised, and with an apparatus of this description he made over 2000 flights in safety. He met his doom while using a biplane glider, falling from a height of about 80 metres and breaking his neck. These experiments were further carried out by Chanute in New York; he introduced several new ideas. The experiments were also continued at the beginning of the present century by the brothers Wright. These 2 young Amers., Orville and Wilbur, were originally cycle makers of Dayton, Ohio. They followed up the ideas which had already been promulgated by Lilienthal and Chanute. The result of these experiments was that in 1903 the brothers Wright produced their first aeroplane. The first invention of the Wrights was simply an aeroplane that flew in a straight line, but this received many modifications, and in 1908 they came to France to carry on experiments there. So much mystery had surrounded them, and so many canards had been spread concerning them, that their successful flights came to the many as a great surprise. During the experiments Wilbur Wright created a record by remaining in the air for over an hr. while carrying a passenger. He also attained a speed of 60 kilometres an hr. During this period, however, great strides had been made by many other inventors. Farman had succeeded in producing a machine with which he remained in the air for nearly 45 min., and he was closely followed, and sometimes surpassed, by the Frenchman Léon Delagrangé. The best results, however, were undoubtedly attained by the brothers Wright, who succeeded in remaining in the air for nearly 2½ hrs. The year 1909 may be taken as the real era of the beginning of successful aviation. In that year records were made only to be broken, and the ultimate success of the monoplane and biplane was proved by many successful experiments. On July 25, 1909, Biériot flew the Channel in a monoplane, but in the same year Farman covered a distance of nearly 110 m. in 4 hrs. on a biplane. Between 1890 and 1903 the best distances flown were 164 ft. by Clément Ader in France in 1890, 852 ft. in 1903, 20½ m. in 1905, and 50 m. 1638 yds. in 1908, all by Orville Wright in the U.S.A.

Compared with the First World War period and after, progress was relatively slow in the 5 years preceding that war. Up to that time the chief international records were: *duration*, 24 hrs. 10 min. by Boehm (Ger.) in an Albatros biplane, 1914; *distance* (over circuit without alighting), 1200 m. by Landmann (Ger.) in an Albatros biplane, 1914; *distance* (in straight line without alighting), 486·87 m. by Deroye (It.) in a Biériot monoplane, 1913; *altitude*, 25,750 ft. by Oelrich (Ger.) in a D.F.W. biplane, 1914; *speed*, 126·59 m.p.h., by Prevost (Fr.) in a Deperdussin monoplane, 1913. Passenger-carrying records were: *duration*, 19 hrs. 47 mins., 9 passengers, pilot Noël (Fr.) in Graham-

White biplane, 1914; *distance*, 68·3 m., 6 passengers, pilot Garaix (Fr.) in Schmitt biplane, 1914; *altitude*, 980 ft., 15 passengers, pilot Sykorsky (Russian) in Sykorsky biplane, 1914; *speed*, 66·85 m.p.h., 6 passengers, pilot Garaix in Schmitt biplane, 1914; *flying over sea*, 320 m., Cruden Bay (Scotland) to Kleppø (Norway), pilot Gran (Norwegian) in Biériot monoplane, 1911. Garaix in Sept. 1913 flew 700 m. across the Mediterranean, but passed over Sardinia en route. Among the best Brit. flights of those years were 107 m. 1320 yds. in 3 hrs. 12 mins. 40 secs. by T. Sopwith and 185 m. 810 yds. in 4 hrs. 47 mins. by S. F. Cody, both in 1910. These pioneer records, if valuable, look unimpressive to-day. It was the First World War (see also AERIAL WARFARE) which gave so great an impetus to A. in all its branches, and if progress during that period was hastened by and directed along the lines of military necessity, it ensured to the ultimate benefit of aviation generally.

The transition of both heavier-than-air machines and dirigibles from the experimental stage to the practical, judged by the low percentage of accidents as compared with other modes of transport, by the immense distances flown without a stop, and by the regular use of air routes involving the carriage of more than 100,000 passengers (in Brit. aircraft) annually over a total distance of more than 1,000,000 m., was complete many years ago. A further indication of the progress made was afforded by the existence of national and international laws for the regulation of civil aviation, the creation of air ministries, and the establishment of aerodromes in all countries. The increasing reliability of heavier-than-air machines was shown by the long distance and spectacular flights of recent years. The most remarkable oceanic flight was the lone venture of Capt. Chas. D. Lindbergh, of U.S.A., in flying from New York to Paris in the *Spirit of St. Louis* (see ATLANTIC FLIGHTS). Subsequent to Lindbergh's flight (3000 m. in 33 hrs.) there were 12 flights across the Atlantic from W. to E., but there was no solo flight until that of the late Miss Amelia Earhart, who, in 1932, flew from Newfoundland to Ireland (2026½ m. in 13 hrs. 30 min.). In 1933 Wiley Post flew from New York to Berlin (4000 m. in 26 hrs.) and, concluding the journey to New York via Siberia, thus made the first solo flight round the world (16,500 m.). The first E. to W. transatlantic solo flight was made by J. A. Mollison in 1932 in a Puss Moth machine from near Dublin to New Brunswick (2400 m. in 30½ hrs.). Mollison and Amy Johnson flew the Atlantic together from Penderine in Wales to Bridgeport, U.S.A., via Canada, in the same year, this being the first flight from Britain to U.S.A.

The first flight to Australia was that made by Sir Alan Cobham, who flew there and back (28,000 m.) in 1926. Two years later Capt. Herbert Hinkler, of Australia, flew from Croydon to Port

Darwin (10,340 m.) in 15½ days at an average speed of 95 m.p.h., stopping at various large ins. at intervals between 400 and 900 m., but in 1930 Sir Charles (then W.C.) Kingsford Smith made the same journey in about 10 days. In 1930 Miss Amy Johnson, in a Gipsy Moth, set up a record for a solo flight from London to India and, continuing her journey, reached Port Darwin in 19 days, having covered in all 9960 m. Other notable Australian flights include those of C. W. A. Scott, London to Port Darwin in 9 days 3 hrs. 30 min. and back to London (1931); J. A. Mollison, Australia to England in 8 days 22 hrs. 25 min. (1931); A. C. Butler, England to Australia in 9 days 2 hrs. 20 min. (1931); C. W. A. Scott, London to Australia, 10,200 m., in 8 days 20 hrs. 44 min. (1932); in 1933 Kingsford-Smith and C. F. Ulm made 2 flights in stages in 7 days 4 hrs. 47 min. and 6 days 17 hrs. 56 min. respectively. In 1934 C. W. A. Scott, with T. Campbell Black, further reduced these times, by winning the 'Mac Robertson' international air race from England to Australia. This race started from Mildenhall (Suffolk) on Oct. 20, 1934, and the 2 men, flying a D. II. Comet, reached Melbourne on Oct. 23, their time being 70 hrs. 34 min. 18 secs., but the handicap prize was awarded to the winners of the second place, Parmenter and N. Moll, flying a K. I. M. luer with passengers and mail, whose time was 90 hrs. 13 min. 36 sec. The first woman to fly from England to Australia was Jean Batten, who, in 1935, flew the outward journey in 14 days 23½ hrs. and the homeward in 17 days 16 hrs.

A successful trans-Pacific journey was that of Kingsford-Smith, pilot, and C. T. Ulm, relief pilot, with H. W. Lyon, navigator, and I. Warner, radio-operator, both of U.S.A., in a triple-motor monoplane. They flew from California to Honolulu, Fiji, and on to Melbourne, 7800 m., in 3 days 16 hrs.; the features of the flight being accuracy of navigation and continuity of wireless communication.

The first Cape Town flight from England was that by Alan Cobham in 1925 (a distance of 17,000 m.). J. A. Mollison flew from England in 4 days 17 hrs. 19 min. in 1932, but this record was soon beaten by Amy Johnson, who flew from Lympne to the Cape in 4 days 6 hrs. 54 min. In the same year 2 Fr. airmen, Goulette and Salel, flew from Le Bourget to Cape Town in 91 hrs.

In Polar regions Capt. Hubert Wilkins, the explorer, flew from Alaska to Spitzbergen (20,000 m.) in a monoplane with a Wasp engine, to demonstrate the superiority of the plane over the dirigible for Arctic flights. In 1926 Rear-Adm. Byrd, U.S. Navy, accompanied by Pilot Floyd Bennett, flew from King's Bay, Amsterdam Is., direct to the N. Pole, and back to his starting point—a total distance of 1600 m. in under 16 hrs. The same aviator has also flown over the S. Pole.

In these days air records do not stand long unbeaten; but we may note the following aviation records and per-

formances: a non-stop flight in 1929 from England to India (4130 m.) by S./Ldr. A. G. Jones-Williams and F./Lt. N. H. Jenkins in an R.A.F. monoplane, taking 50 hrs. 38 min.; by Capt. C. D. Barnard and the Duchess of Bedford, from Lympne to Karachi and back to Croydon in 7½ days, in 1929; by R. F. Caspareuthus of S. Africa, from London to Cape Town in 8½ days, in 1930. The U.S. Army monoplane flight of 1929, lasting 150 hours, was remarkable for the feat of refuelling in the air. In 1933, S./Ldr. O. G. Gayford and F./Lt. G. E. Nicholetts made a non-stop flight from Cranwell to Walvis Bay, 5309 m. in 57 hrs. 25 min. in a Fairey (Napier) monoplane, while in the same year, P. Codos and M. Rossi flew from New York across the Atlantic to Syria, 5657 m. in 54 hrs. 44 min. Two lt. squadrons of flying-boats, consisting of 25 Savoia-Marchetti S.55 seaplanes, carried out a flight in formation to New York, via Holland, Iceland, Greenland, Labrador, and Montreal, covering in all 11,770 m. in 42 days, all but 2 machines returning. In 1931 Sir Charles Kingsford-Smith crossed the Pacific again, this time from Brisbane to California (7410 m.). C. J. Melrose, from Australia to Croydon, in 8 days 9 hrs. (1934); H. L. Brook, Port Darwin to Lympne, 7 days 19 hrs. 50 min. (1935); H. F. Broadbent, England to Port Darwin, in 6 days 11 hrs. 19 min. (1935); Jean Batten across the S. Atlantic from Dakar to Brazil in 13 hrs. 15 min. (1935); F./Lt. Rose, Lympne to Cape Town, in 3 days 17 hrs. 31 min., returning in 6 days 6 hrs. 57 min. (1936); Mrs. Mollison (Amy Johnson) (Gravesend to Cape Town, 6400 m. in 3 days 6 hrs. 25 min., returning to Croydon (7885 m.) in 4 days 16 hrs. 17 min. (1936); in 1936 Mrs. Markham made the first solo flight by a woman across the Atlantic from E. to W., flying from England to Cape Breton; double crossing of the Atlantic by Harry Richman and Richard Merrill (1936); Jean Batten, solo flight from New Zealand to Australia in 4 days 21 hrs. 3 min., afterwards completing the flight to Auckland, the whole journey occupying 11 days 56 min. (1936); J. A. Mollison, Newfoundland to Croydon in 13 hrs. 17 min. (1936); Inuvara and Tsukagoshi, from Tokyo to Croydon, 94 hrs. 18 min., a distance of 10,000 m. (1937); H. F. Broadbent, Port Darwin to Lympne, 9825 m., in 6 days 8 hrs. 25 min. (1937); H. L. Brook, Cape Town to Heston aerodrome, 6980 m. in 4 days 20 min. (1937); Merrill and Lambie (U.S.A.), Atlantic double crossing from Brooklyn to England (Sussex), 20 hrs. 31 min., and from Southport (Lancashire) to Quincy, Massachusetts, in 22 hrs. 27 min. (1937); Gremov, Yumashev, and Danilin (Soviet), from Moscow, over the N. Pole, to California (6700 m.), being the record non-stop flight up to that year, in 2 days 14 hrs. (1937); Jean Batten, from Port Darwin to Lympne, 9900 m. in 5 days 18 hrs. 15 min. (1937); F./O. Clouston, R.A.F., and Mrs. Kirby Green, from Croydon to Cape Town, 6370 m. in 1 day, 21 hrs.

6 min. and back to Croydon, 7135 m. in 2 days 9 hrs. 23 min. (1937); F/O. Clouston and V. Ricketts, England to New Zealand, in 4 days 7 hrs. 8 min., and back, the whole journey taking 10 days 21 hrs. (1938); H. P. Broadbent, Port Darwin to Lympne, in 5 days 5 hrs. 21 min. (1938); Ger. seaplane *Dornier 28*, flew from Devon to Rio de Janeiro, 5100 m. in 43 hrs. (1938); Mlle. Elizabeth Lion (France) flew from Istres to Basra, 7500 m., this being the longest flight by a woman (1938); Howard Hughes (U.S.A.) and 4 companions made a round journey from New York, via Paris, Siberia, Alaska, and Canada, back to New York in 3 days 19 hrs. 17 min. (1938); D. Corrigan (U.S.A.) New York to Eire in 28 hrs. (1938); Brit. seaplane *Mercury* accomplished shortest E. to W. Atlantic crossing, from Foynes (Eire) to New York, in 13 hrs. 29 min. (1938); in the same year, the *Mercury*, under Capt. D. C. Bennett, with First Officer Harvey, launched pick-a-back, flew 6045 m. in 42 hrs. 6 min. from Dundee (Scotland) to the mouth of the Orange R., while attempting a non-stop flight to Cape Town.

The long-distance record until 1939 was held by the R.A.F. with the flight of 3 Vickers-Wellesley bombers from Ismailia for Australia (Nov. 1938). L.2638 and L.2680 reached Darwin in about 48 hrs. and L.2639, which had refuelled at Koepang, followed some 3½ hrs. later; the non-stop distances flown being 7162 and 6600 m., and the average speed was 149 m.p.h. Other flights in recent years: S. African Lockheed machine, Pretoria to Nairobi, 2000 m. in 10½ hrs. (Oct. 1940); Pat Paves beat the Sept. 1937 record from Newfoundland to Eire (1941); Caleb Haynes, Curtis, Lemay, and Cochran, 4 engineering U.S. bomber officers, Takoradi (Gold Coast) to Belem (Brazil), 3400 m. 13½ hrs., longest flight to be completed in daylight (Oct. 3, 1941); Capt. O. P. Jones, in Amer. Liberator, flew from U.S.A. to England (Atlantic Ferry), 8 hrs. 23 min., beating the previous fastest time by 22 min. Capt. Cramer, in a Liberator, flew the journey on Dec. 5, 1943, in 8 hrs. 29 min. In May 1943 Capt. W. S. May, also in a Liberator, flew from Newfoundland to Great Britain in 6 hrs. 20 min. In the same month Capt. S. T. B. Cripps (B.O.A.C.) flew from Montreal to Britain in 12 hrs. 51 min. Soon afterwards Capt. C. W. A. Scott did the journey in 12 hrs. 21 min. On Nov. 29, 1943, Capt. Richard Allen, in a Liberator of the R.A.F. Transport Command, did the journey in 11 hrs. 35 min. On Nov. 6, 1943, Capt. G. B. Lothian in a Lancaster flew from Montreal to Britain in 10 hrs. 13 min. On Mar. 23, 1943, Capt. J. H. Hart and crew in a Boeing flying boat flew from Natal (Brazil) to W. Africa and back in 23 hrs. 59 min. A Liberator of the R.A.F. Transport Command flew from England to Bathurst (Gambia), a distance of 3150 m., in 15 hrs. 58 min., this being the first direct passenger-carrying flight from England to W. Africa. In May 1944 a Mosquito (no

pilot named) is said to have completed the Atlantic crossing in 6 hrs. 46 min. In Nov. 1944 F/Lt. J. Linton in a Mosquito of Transport Command flew from Britain to Karachi in 16 hrs. 46 min. overall time or 14 hrs. 37 min. flying time. On Feb. 9, 1945, a Liberator (B.O.A.C.) crossed from Newfoundland to England in 7 hrs. 18 min. But the record up to 1946 was held by a reconnaissance Mosquito of Coastal Command flown by W./C. J. R. H. Merrifield, which crossed in 5 hrs. 10 min. A transcontinental W. Airways aircraft on Nov. 26, 1945, flew from Gander, Newfoundland, to Rineanna, Eire, in 6 hrs. 55 min., at an average speed of 297 m.p.h. The Pan-Amcr. Airways *Constellation* set up a new record for the Atlantic crossing on Feb. 4, 1946; carrying 29 passengers and a ton of freight it flew from New York to Shannon airport, Eire, in 11 hrs. 9 min. It did the 1020 m. from New York to Gander in 4 hrs. 33 min., and the rest of the journey, 1775 m. in 6 hrs. 36 min. In 1946 R.A.F. Lancaster *Aries* achieved the following flights: Britain-Cape Town, 32 hrs. 21 min. (Jan. 16); Blackburn, Surrey-New Plymouth, New Zealand, 59 hrs. 50 min., via Karachi (19 hrs. 14 min.) and Darwin (45 hrs. 35 min.), Aug. 22-24. A Pan-Amcr. Clipper crossed from Newfoundland to Shannon, Eire, in 5 hrs. 23 min. on Apr. 27, 1947. On May 29, 1947, a B.S.S.A. Lancaster flew to Bermuda in 20 hrs., refuelling in mid-air. The first transatlantic automatic flight was made (Sept. 21-22, 1947) by a pilotless U.S. Army Skymaster from Newfoundland to Britain.

**Speed Records:** The Schneider trophy (v.v.) contest has produced high speed records: 318.62 m.p.h. at Venice, on Mar. 30, 1923, by Maj. Mario de Bernardi; 328.63 m.p.h., over the Solent on Sept. 7, 1929, by F/O. Waghorn (R.A.F.). 284 m.p.h. being on that occasion the speed of the runner-up, Dal Molin of Italy, and 282.11 m.p.h., that of F/Lt. D'Arcy Greig (R.A.F.), who, at Calshot, 1929, reached 319.57 m.p.h. On a supermarine Rolt-Rove S. 6 S./Ldr. A. H. Orlebar set up, also in 1929 at Calshot, a world's record for 3 kilometres, averaging 355.8 m.p.h. This, however, was exceeded in 1931 by F/Lt. G. H. Stainforth, who averaged 389.67 m.p.h. at Lee-on-Solent, his fastest circuit being 408.288 m.p.h. The Schneider trophy contest has since been discontinued, the cost and risk alike being considered to be excessive. Until 1946 the air speed records were: W/O. Agelle over Lake Garda, Italy, 423.76 m.p.h. (682.483 km.) in 1937. Dr. Wurstner, Germany, 379 m.p.h. (610 km.) over land, in 1938. S./Ldr. J. W. Gillan, 327 m. in 48 min. (408.7 m.p.h.), at night over land. At Augsburg in Apr. 1939, a Messerschmitt 109 set up a record of 469.2 m.p.h. This last record was unbeaten for 6 years, when, on Nov. 7, 1945, 2 Meteor jet-propelled aircraft both averaged over 600 m.p.h. G/C. W. J. Wilson averaged 606 m.p.h. and Mr. Eric Greenwood 603 m.p.h.; Cmdr. Turner Caldwell, U.S.

Navy, achieved an average speed of 640.7 m.p.h. over a 1.86-m. course in California, the highest speed reached being 653.4 m.p.h., on Aug. 21, 1947. Mr. John Derry attained a speed of 605.23 m.p.h. over a 100-km. closed circuit course in Hertfordshire, England, on Apr. 12, 1948.

*Altitude Records:* F. Lt. M. J. Adam, 53,937 ft., in 1938; Lt.-Col. Mario Pezzi (It.), 56,017 ft., in 1938; Mr. John Cunningham, 59,492 ft., in 1948.

*Airship Flights, etc.*—The *Graf Zeppelin* left Friedrichshafen on Oct. 11, 1928, and reached Lakehurst, New Jersey, in 11½ hrs. (return journey took 71 hrs.), covering 6300 m., and going via France, Gibraltar, Funchal, the Azores, and Virginia. The commander was Dr. Hugo Eckener, the designer, and with him was a crew of 40. The flight was successful despite storms, wind, and fog, and from the time taken indicates a considerable advance since 1919, when the Brit. dirigible *R34* flew from E. Fortune, Scotland, to Mincola, New York, or 3130 m. in 108 hrs. The only other crossings were in 1924 by the *Los Angeles* from Lake Constance, in somewhat better time and by the Brit. airship *R100*, which flew from England to Montreal in Aug. 1920, taking about 5 days. The *Graf Zeppelin* was flown round the world in 1929, taking 21 days and reaching Lakehurst Aug. 29, and also in 1930. The loss of the Brit. airship *R101* in 1930 and of the Amer. airship *Akron* in 1933 has reinforced the agreements against the continued construction of airships (q.v.).

A remarkable experiment, but only partly successful, was that of Juan de la Cierva, who in 1928 crossed the Channel in an autogyro at a speed of 90 m.p.h. and toured England for 3000 m. This machine was wrecked a few days later, owing, it seems, to a broken landing cable rather than to any structural defect (see under *AUTOGYRO*).

In commercial development it is probable that the U.S.A. are ahead of Great Britain, in that the aeronautical industry has so far secured the co-operation of the banking and financial interests as to have emerged from the subsidised or dependent state to that of an industry supported by the public as a whole. In this connection, the trustees of the Daniel Guggenheim Fund, created to assist commercial aviation and to stimulate public interest in its development, are now able to concentrate on aerodynamics and cognate problems. (For designs of and developments in aeroplanes see *AERO-ENGINES*; *AEROPLANE*; for progress in theories of viscosity and allied topics see under *AERODYNAMICS*.)

See J. E. Hodgson, *The History of Aeronautics in Great Britain, 1921*; S. A. Vento, *Air Liners and Airways of To-day, 1947*.

**Aerophor**, a musical appliance for enabling a wind-instrument player to sustain his notes *ad infinitum*, invented by Bernard Samuels, flautist in the Duke of Mecklenburg-Schwerin's orchestra. It consists of a small bellows worked by the

foot, with rubber tubing attached, ending in a metal reed fixed near the mouth-piece of the instrument played. The air from the player's lungs is prevented from passing into the bellows by a stop-cock in the tubing. First used in Richard Strauss's *Festliches Präludium*, written for the opening of the Concert House, Vienna, 1913.

**Aeroplane**, a power-driven heavier-than-air flying machine, that obtains its lift from fixed wing surfaces.

*History.*—The first flight of 12 sec. by such a machine was made by Orville Wright at Kitty Hawk, N. Carolina, on Dec. 17, 1903. The first crude *As.* consisted of flimsy single-surface wings of fabric stretched over wooden frames, engine and pilot carried in the open framework of an uncovered fuselage, and the tail surfaces. After the initial flight, progress was slow until the years just prior to the First World War, when the development of more powerful and lighter engines gave the *A.* designer a better chance to make practical types. In those early years a surprising number of successful far-sighted experiments were made: the Bréguet all-metal biplane with tricycle undercarriage; the Antoinette streamlined monoplane with surface radiators; the Dunne inherently stable tailless machines; the close-cowled streamlined engine installation; the Nieuport cantilever monoplane; the amphibian flying boat Sopwith Bat Boat, to name a few. Despite these outstanding examples the usual *A.* was a simple tractor biplane like the Avro 504 (Fig. 1a) or a pusher biplane with the tail carried on booms behind the nacelle as on the Vickers 'Gun Bus' (Fig. 1b), which was one of the earliest gun-carrying *As.*

During the First World War engine power increased rapidly, while aerodynamic design did not make great progress beyond the general adoption of the tractor arrangement because of its simpler form. The biplane was the most general because it was easier to brace than either the monoplane or the triplane. Generally, thin wing sections were used for speed because of their lower drag, although one designer, Anton Fokker, had realised the possibilities of thick sections which could be used for internally braced cantilever wings. One of the 1918 Fokker designs is shown in Fig. 2.

Immediately after the war a boom in air transport led to the conversion of many of the larger military types, and to the building of some specialised air liners; but, to all intents and purposes the *As.* of the first decade after the war showed little advance on those of 1918— aerodynamically, structurally, or in performance. In 1929 the Brit. Air Ministry radically revised its ideas on military *As.*, and the Hawker Hart light bomber and Fury single-seater fighter (Fig. 3) set a new standard in performance, the former being capable of nearly 200 m.p.h. and the latter of over 200 m.p.h. About this time the monoplane began to come into favour on the Continent and in the U.S.A., first for air liners, and later

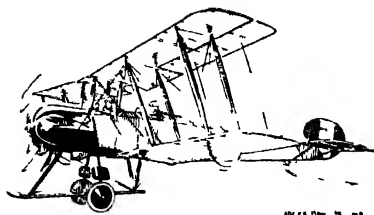
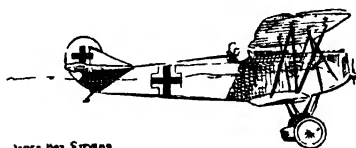


FIG. 1A

**TWO-SEATER TRACTOR BIPLANE, 1913**

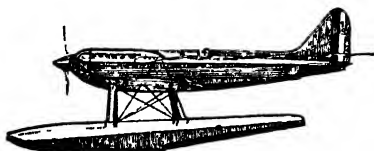
The Avro 504 (30 h.p. Gnome rotary engine) which was used, in modified form, until 1940



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**FIG. 2. SINGLE-SEATER FIGHTER, 1918**

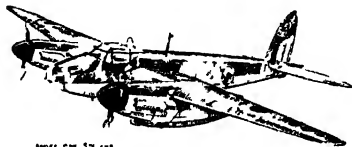
The Fokker D VII (180-h.p. Mercedes water-cooled engine), which had cantilever, thick section main planes. Speed 120 m.p.h.



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**FIG. 4. RACING MONOPLANE FLOAT SEAPLANE, 1931**

The Supermarine S6B (3000-h.p. Rolls Royce R engine), winner of the Schneider trophy, holder of the world speed record at 457 m.p.h. and forerunner of the Spitfire and Merlin



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**FIG. 6A. TWO-SEATER FIGHTER-BOMBER-RECONNAISSANCE MONOPLANE, 1940**

The de Havilland Mosquito B IV (1200-h.p. Rolls-Royce Merlin engines), one of the many versions of this versatile type. Some variants have a speed of over 400 m.p.h., most do about 300 m.p.h.

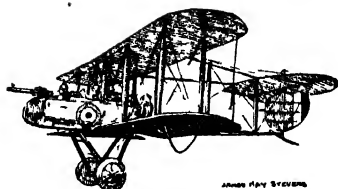
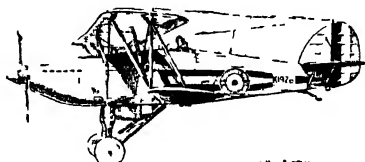


FIG. 1B

**TWO-SEATER PUSH-ROTOR BIPLANE, 1914**

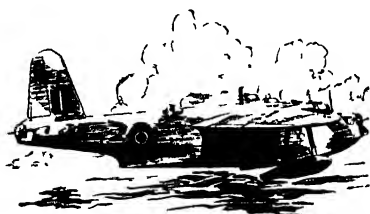
The Vickers 'Gun Bus,' which had a machine gun operated by the observer in the nose



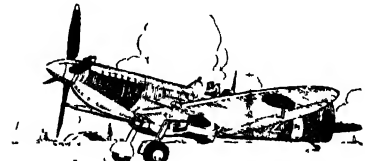
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**FIG. 3. SINGLE-SEATER FIGHTER, 1929**

The Hawker Fury (450-h.p. Rolls Royce Kestrel water-cooled engine), all metal structure with fabric covering. Speed 207 m.p.h.

**FIG. 5. FOUR-ENGINE D RECONNAISSANCE FLYING BOAT, 1938**

The Short Sunderland I (1000-h.p. Bristol Pegasus engines) used for ocean patrols during the war

**FIG. 6B. SINGLE-SEATER FIGHTER MONOPLANE, 1942**

The Supermarine Spitfire IX (1200-h.p. Rolls-Royce Merlin), a later version of the famous fighter first flown in 1936; this type had a speed of nearly 400 m.p.h.

for military use. With the advent of the monoplane there was also a gradual change over to wood—and then metal-covered structures. During the period 1919 to 1931 the Schneider trophy contest gave a fillip to the development of high-speed *As.*, and the Supermarine S-6 and Rolls-Royce R engine of 1929 and 1931 (Fig. 4) were the direct ancestors of the Spitfire and Merlin.

other countries produced aeroplanes as fast as those designed for the R.A.F.

The period 1939-45 saw a somewhat similar development to that in the previous war; *i.e.* extra speed was gained mainly by adding more and more engine power, culminating in the advent of the jet engine. Outstanding among the aeroplanes of this period were the Spitfire (Fig. 6B), whose speed was raised by more



FIG. 7A. SUPER-FORTRESS FOUR-ENGINED HEAVY BOMBER MONOPLANE, 1943  
The Boeing B 29 (2200-h.p. Wright Cyclone engines) high-altitude bomber with heavy armament.

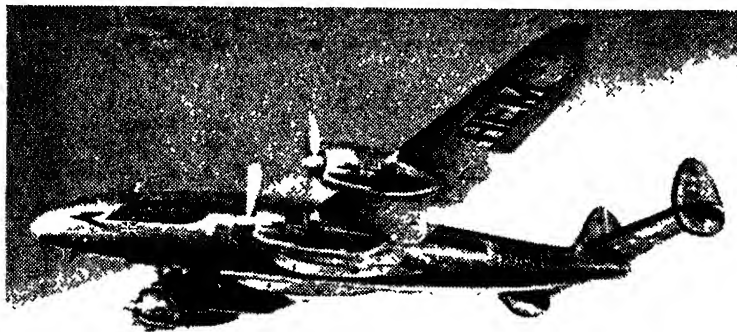


FIG. 7B. FOUR-ENGINED MONOPLANE AIR LINER, 1945  
Lockheed Constellation (Wright Cyclone 2500-h.p. engines) used for transatlantic flying; it has a pressure cabin to increase passenger comfort above 20,000 ft.

In the early nineteen-thirties the *Americans* started to use 200-m.p.h. air liners, the Boeing 247, Lockheed Orion, and Douglas DC-2 being among the first. Gradually other countries followed their lead, although Great Britain, in particular, retained strut-braced, fabric-covered biplanes until shortly before the Second World War for many civil and military purposes. In 1935 a number of outstanding prototypes appeared in Great Britain: the Short Empire flying boat, the first really modern 200-m.p.h. large flying boat; the first single-seater fighters to exceed 300 m.p.h., the Hurricane and Spitfire; and the first light bomber to approach 300 m.p.h., the Bristol Blenheim. Up till this time Brit. *As.* had been renowned for their quality and dependability rather than for their performance, but for the next 10 years few

than 100 m.p.h. between 1939 and 1945; the Brit. heavily armed, large-load-carrying, 4-engine bombers, the Avro Lancaster, Handley Page Halifax, and Short Stirling; the fast wooden light bomber-fighter-reconnaissance de Havilland Mosquito (Fig. 6A); the high-altitude long-range Boeing Super-Fortress heavy bomber (Fig. 7A); and the Messerschmitt Me 163 (Fig. 8) and 262, the first jet-propelled, 500 m.p.h. fighters.

By the end of the war speeds of 600 m.p.h. (Gloster Meteor, Fig. 9); bomb loads of 10 tons (Lancaster); ranges of 5000 m. (Super-Fortress); passenger loads of over 100 (*i.e.* Boeing C-97); and ceilings of 45,000 ft. (Spitfire XIV) were practical propositions, and not mere record performances.

*Theory of Flight.*—Briefly the lift of a wing is obtained from the suction above



FIG. 8. TAILLESS ROCKET-PROPELLED FIGHTER MONOPLANE, 1944

The Messerschmitt Me 163 which, although not a great success, represents some of the latest ideas on high speed design and was the first operational type capable of more than 550 m.p.h.

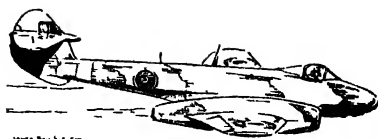


FIG. 9. TWIN-JET, SINGLE-SEATER FIGHTER, 1946

The Gloster Meteor IV (3000 lb thrust Rolls-Royce Derwent jet engines) which, very slightly modified, broke the world's speed record at 616 m.p.h., on Sept. 7, 1946

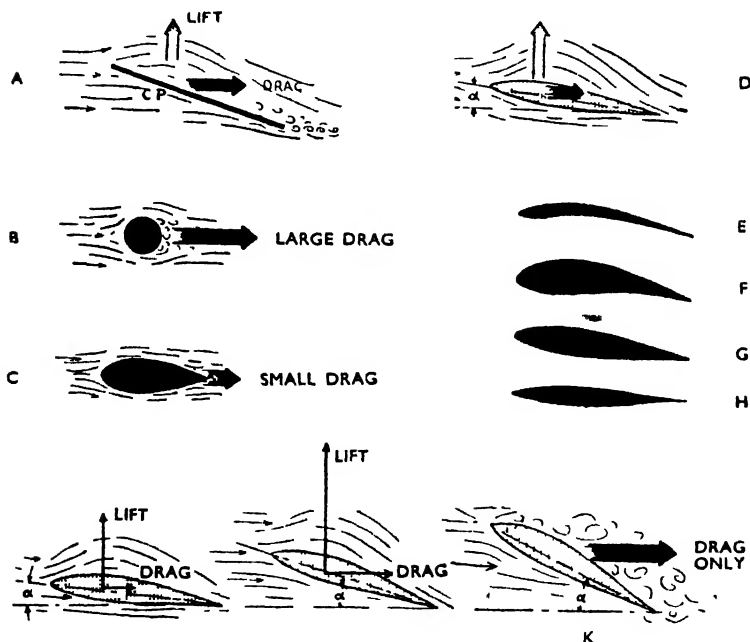


FIG. 10. DEVELOPMENT OF THE AEROFOIL SECTION AND THE EFFECT OF ANGLE OF INCIDENCE UPON LIFT

- A. Flat plate—lift and drag, act at C.P., centre of pressure
- B. Cylinder—drag only
- C. Streamline—low drag
- D. Aerofoil section—combination of (a) and (c) giving lift and low drag
- E. Early thin, highly curved section

- F. Thick, high-lift section as used on gliders
- G. Modern general purpose bi-convex section
- H. High-speed thin symmetrical section
- I. Small incidence ( $\alpha$ ): moderate lift, low drag
- J. Large incidence high lift, increased drag
- K. Stall, breakdown of air flow, no lift, large drag



and pressure beneath a plate when it is passed through the air at speed (Fig 10). Since a thin plate is not very efficient and is difficult to construct, it is combined with a streamline to form an aerofoil section. There are hundreds of such

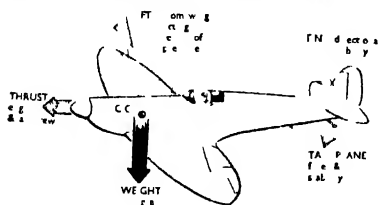


FIG 11A THE PRINCIPAL FORCES ON AN AIRPLANE IN STATIC EQUILIBRIUM

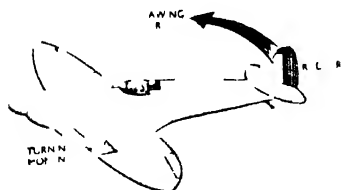
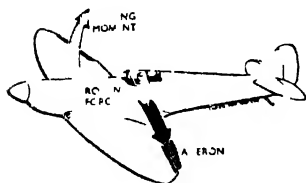
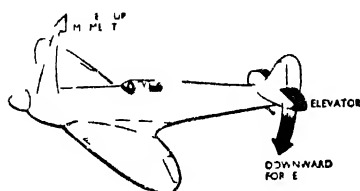


FIG 11B THE ACTION OF THE THREE CONTROL SURFACES

sections the earliest being thin and highly curved (Fig 10E), then they began to become thicker (and easier to make structurally) until with the advent of very high speeds after 1940 they were made thinner again (Fig 10H).

The lift of the wing increases with the angle to the air flow ( $\alpha$ ), as does the drag,

or resistance until at a point called the stall the air ceases to flow smoothly over the wing and all lift is lost. This state of affairs also exists when the speed of the wing through the air is insufficient to cause enough suction to give lift.

When a wing moves through the air at high speed the boundary layer (or envelope) of air close to its surface moves at a lower speed than the rest, owing to its clinging to the surface of the aerofoil. If this boundary layer is flowing smoothly (laminar flow) there is little resistance, but if it is turbulent there is a great deal of drag. At the present time much energy is being expended in trying to induce this laminar flow for, as the speed of sound is approached the turbulent area creeps forward until it breaks away in a shock wave. This shock wave is a sudden

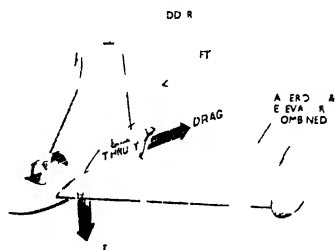


FIG 12 EQUILIBRIUM AND CONTROLS OF A TYPICAL TAILLESS AIRPLANE

in case in pressure where the local velocity of the air exceeds the speed of sound. When this occurs there is a very sudden rise in the drag of the wing while just before its onset there are several disturbing phenomena that upset the stability of the A.

A wing on its own would be of little use and at the rear of the fuselage a fixed horizontal tail plane and a fixed vertical fin provide stability (Fig 11A). Control is obtained by adding hinged flaps to wing, fin and tail plane. A tail on the end of the fuselage is not essential to stability, although it is the simplest way of obtaining it. Many tailless As have been built and flown successfully. One of the commonest forms is shown in Fig 12, the rudders are at the wing tip while the ailerons and elevators are placed along the trailing edge of the swept back wing—balance being obtained by this sweepback. Obviously, where there is no tail weight and drag are saved, while recent aerodynamic research has shown that sweepback has a good effect on air flow at high speeds, so that such As are becoming more common.

Since the air resistance of the wing is the greatest part of the resistance of the whole A it has to be kept as small as possible. A small wing provides less lift, so a compromise is made by fitting slots to the leading edge and/or flaps to the trailing edge. The action of these

devices is shown in Fig. 13. All modern As. have flaps of some type and many have slots.

**Structural Developments.**—The essential need for an A. structure has always been lightness. Originally achieved by using frameworks of wood braced by wires and covered with fabric for both wings and fuselage; gradually there was a change to fabric-covered tubular metal structures (some still wire-braced, others welded) or to all-wood designs where the

structure (geodetic) covered with fabric was employed.

The alighting gear (undercarriage) of As. has always presented the designer with problems: it must be light yet capable of supporting sev. times the weight of the whole A. when it is brought violently to the ground: it has to be resilient to absorb such shocks and at the same time it must not be too springy or the A. will bounce badly when taxiing. Early undercarriages consisted of

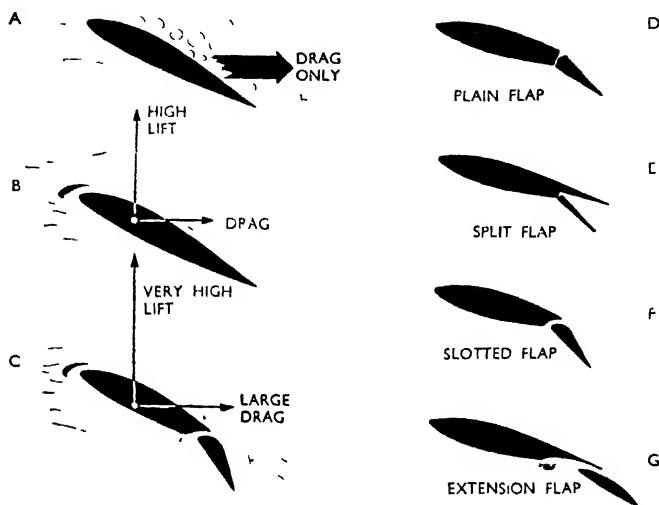
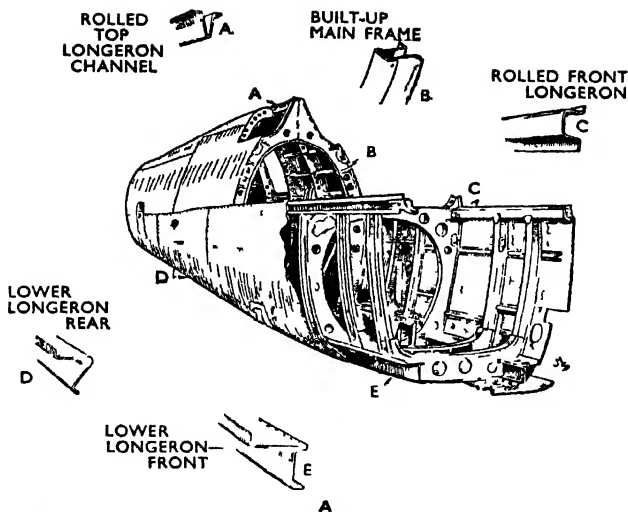


FIG. 13. HIGH-LIFT DEVICES

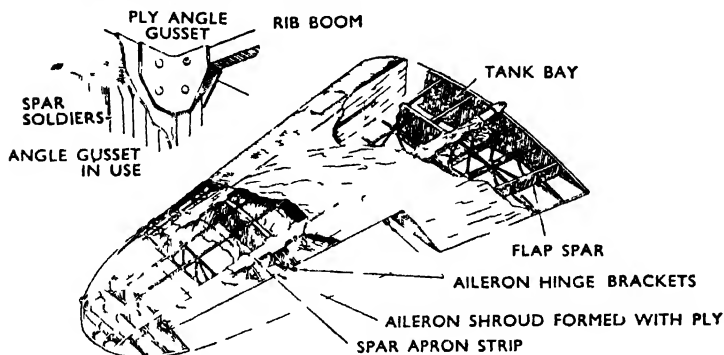
- A. Stalled wing
- B. Addition of slot to (A) smooths air flow and prevents stall, at same time giving high lift
- C. Addition of flap to (B) increases both lift and drag
- D. Plain flap
- E. Split flap
- F. Slotted flap
- G. Extension flap, increases area as well as camber

plywood skin of fuselage and wing (Fig. 14B) carries part of the structural loads. Since 1930 the tendency has been to make all classes of A. of the all-metal stressed-skin type (Fig. 14A). In this case the whole A. is usually made of an aluminium alloy, the fuselage having light longitudinal members (stringers), light transverse frames, and a sheet-metal covering; the whole being joined by riveting and forming, in effect, a light metal tube. The wing is of similar construction, but the main loads are taken by one or more transverse spars. Notable modern exceptions to the all-metal rule are the de Havilland Mosquito, made largely from balsa wood and spruce, and the Vickers Armstrong Wellington where a type of lattice

of light wire-spoke wheels carried on an axle tied to the apices of 2 wood or tubular vees by rubber cord, which served as the sole shock absorber. Later coiled springs, rubber blocks, and oil and air pistons were incorporated to form shock absorbers with better qualities. Recently, for very large As., the compressibility of fluids at very high pressures has been utilised to provide a compact and light springing medium. The development of wheels and tyres have resulted in magnesium-alloy cast wheels with large-contact medium-pressure balloon tyres for most types of aircraft. With the increase of performance the drag of an undercarriage became substantial and the majority of modern As. capable of speeds over 150 m.p.h. are fitted with



A Spitfire stressed skin metal fuselage with light alloy stiffening members and duralumin skin.



B An Oxford wooden main plane with spruce and plywood spars and light lattice ribs, the whole covered by plywood

FIG 14 A & B. WOOD AND METAL AEROPLANE STRUCTURES

retractable undercarriages. The retraction is most commonly done by hydraulically operated jacks, although pneumatic power is also used and some systems have been designed using electric motors and screw jacks.

Originally, piston engines (see *AFRO-ENGINES*) were used to drive the airscrew, but now the jet engine is replacing it for high-speed As. Where only moderate speeds are required the jet engine is inefficient and the jet/airscrew engine

is used. With this engine more thrust can be obtained at take-off and the cruising power is more economically converted into thrust. The airscrew has been developed from a wooden 2- or 4-bladed type, first to a duralumin or steel one and then (in 1927) the variable-pitch mechanism was added. The object of this is to change the angle of the blades to suit the speed of the A., so that the engine can be run at its best r.p.m. whatever the speed of the A.

Another advantage is that the blades can be feathered to present low drag if an engine stops in flight. The latest development is a reversible-pitch airscrew in which the blades are turned right round to give a negative thrust and so slow the A. on landing. The reversible pitch can also be used for manoeuvring a multi-engine A. on the ground, or on the water, rather than as an oarsman backs water.

Seaplanes are of 2 general types; land As. mounted on floats or flying boats, where the fuselage is turned into a hull, and is provided with a stepped planing bottom (see Fig. 5) to enable it to lift out of the water. The flying boat is generally used for the larger sizes, while the float plane is used for smaller and faster types. For a long time (from 1925 to 1929 approximately) the world's speed record was held by seaplanes because they were easier to land and take off at high stalling speeds. Generally, though, seaplanes have a lower performance than landplanes; the large flying boat at present has an average maximum speed of 250 m.p.h. compared with 300 to 350 m.p.h. for similar large landplanes. Failing the invention of a satisfactory retractable float system, the float seaplane is always much inferior to the landplane in speed, and also in load capacity and climb because of the weight of the floats and their extra drag. Flying boats carry large loads, though rather slowly.

See A. S. Niles and J. S. Newell, *Airplane Structures*, 1938; C. H. Latimer-Needham, *Aircraft Design: Aerostructures*, 1939; R. Abbott, *Fundamentals of Flight*, 1942; M. Langley, *Metal Aircraft Construction*, 1942; W. Lockwood Marsh, *The ABC of Flying*, 1945; L. Bridgman, *Jane's All the World's Aircraft* (annual).

**Aeroscope**, an instrument for measuring the purity of the air. Air is drawn by an aspirator across a film of glycerine for a given time. The particles adhering to the film and examined for quantity and an estimation of the amount of dust in the air is arrived at.

**Aerotherapeutics**, a mode of treating disease by compressing or otherwise modifying the atmosphere. Many diseases, particularly those affecting the lungs, respond to changes in the pressure, temp., or composition of the air breathed. When a diver emerges suddenly from work at a great pressure, symptoms somewhat resembling those of apoplexy sometimes present themselves. This disease, which is known as caisson disease, or diver's paralysis, may at once be checked if the patient is subjected in an air-lock to a pressure greater than that of the atmosphere. The pressure is then gradually reduced as the body accommodates itself. Pneumatic cabinets, air-tight iron cells into which air can be pumped, if systematically used in asthma, are of benefit, and cases of emphysema have responded favourably to a treatment which comprises the inhalation of compressed air and the breathing into rarefied air.

The 'iron lung' is an apparatus for

carrying out artificial respiration over long periods, for instance when the respiratory muscles have been inactivated by infantile paralysis. It consists of a large metal chamber, containing the patient's body but not his head, in which the air pressure can be alternately increased and decreased, affecting respiration and inspiration respectively.

The diminution of air-pressure is the effective principle of Junod's boot. A case of stiff leather is made to enclose the leg, so that when the air is exhausted, blood rushes to the enclosed part, thus relieving congestion and inflammation of the internal organs. The rarefied air of mts. has a beneficial effect on chronic phthisis, but the changes induced in the lungs make it advisable for the patient to spend the rest of his life in such an atmosphere.

Hot-air treatment is often successful in certain skin diseases, such as lupus, causing necrosis of the diseased tissue. Cold air is valuable in promoting general vigour, so that consumptive patients are often benefited by a climate where the average temp. is lower than that to which they have been accustomed.

The air is varied in composition for the purpose of producing anaesthesia, as in the use of chloroform, ether, and nitrous oxide. The inhalation of oxygen is often beneficial in cases of asthma, and also relieves the difficulty of breathing in pneumonia and heart-failure. Antiseptic substances may be inhaled by using a respirator containing a sponge moistened with the liquid; the constant wearing of such a contrivance tends to arrest the progress of pulmonary tuberculosis.

Allied to the use of artificially modified atmospheres is the climatic treatment for bronchial and lung affections. The individual has to be studied in considering the choice of a climate, but phthisical patients are usually benefited by residence on the high tableland of S. Africa or the high and cold slopes of the Alps. The open-air treatment as carried on in one's own domestic surroundings is also of great value, and many devices for enabling patients to sleep with comfort in the open air are in common use. Finally mention may be made of 'artificial pneumo-thorax', a method of collapsing and testing a tuberculous lung by introducing air into the surrounding pleural cavity.

**Aerschot**, see AARSCHOT.

**Aertzen or Aartsen, Pieter** (1507-73), called Peter the Long because of his height, a Dutch painter, was b. and d. at Amsterdam. Besides his historical and religious works, he painted interiors and homely scenes.

**Æschines**, an orator of Athens, b. about 389 B.C. For the eloquence of his oratory he has been placed next to Demosthenes. In the attitude maintained by Athens towards Philip of Macedon, Demosthenes advocated the wiser policy of opposition. Æ. placed himself at the front of the party supporting the adoption of peace measures. The success of Demosthenes' advice earned public recognition, and

Ctesiphon suggested that a golden crown be awarded as a mark of gratitude. Upon this proposal Æ. vented all the forces of his extraordinary eloquence, and his speech attacking the idea and its mover is placed foremost among his utterances. The greatness of his oratory could only be rivalled by one man, Demosthenes, whose reply, defending Ctesiphon, is placed in the front rank of the world's orations. In addition to the eclipse of Æ.'s eloquence, an accusation was levelled against him by Demosthenes of receiving bribes, but it failed through want of evidence. Æ. was now forced to retire, and shortly afterwards he estab. a school of oratory in Rhodes, which became famed through the empire. He d. in 314 B.C. His oration against Ctesiphon, with 2 others, are, unfortunately, the only works ascribed to Æ. that have come down to us. They are pub. in Jebb's *Attic Orators*, 1876-80.

Æschines Socraticus, the 'Philosopher,' was one of the scholars of Socrates, and according to tradition he was the son of a sausage-maker. Three dialogues, still extant, are supposed to have been written by him.

Æschinite, see THYATIRA.

Æschylus (c. 525-456 B.C.), one of the masters of Attic tragedy in the form posterity knows it. He was b. at Eleusis in Attica, and was the son of Euphorion, a man of good family. He fought at the battle of Marathon, 490 B.C., at Salamis, 480 B.C., and at Plataea, 479 B.C. It was at the beginning of the fifth century that he entered the lists of dramatic competition against Pratinas and Choerilus, and his first victory is believed to have been in 485 or 481 B.C. In 472 B.C. he gained the prize with the trilogy of which his *Persæ* was one piece. In 468 he went to the court of Hiero, king of Syracuse; but returned to Athens on the death of that monarch. He was again in Sicily in 456-55 and d. at Gela, leaving 2 sons, Euphorion and Bion, and a nephew, Philocles, to carry on the literary tradition. The great work of Æ. was to remodel the old drama of the satyr-play (*satyricon*) into tragedy, and it is in Æ. that the distinction, both in name and in character, becomes complete in the Dionysiac cycles. Of the 70 tragedies that he is believed to have written only 7 are extant—the *Suppliants* (dealing with the legend of Danaus); the *Persians* (on the defeat at Salamis); the *Seven against Thebes* (on the beleaguering of Thebes in support of the claim of Polyneices to the kingdom of Oedipus); the *Prometheus Bound* (on the punishment of Prometheus by Zeus for giving fire to the race of men); and the *Orestes*, consisting of the *Agamemnon* (on the tragedy of Agamemnon and Clytemnestra following the fall of Troy); the *Choephori* (on the avenging of his father's death by Orestes); and the *Eumenides* (on the purification of Orestes). Æ. was considered by the Athenians as the father of tragedy because he altered the drama by introducing a second—some say also a third—

actor, made the actor sing as well as the chorus, giving him monodies and also a part in the musical dialogue, and made great improvements in the staging. Æ. is the foremost of the Gk. prophets and, with Pindar, the last. He was a moral and religious teacher as well as an artist, although the literary and dramatic technique of his art has always seemed to overshadow all other considerations.

Eds.: Aldus, 1518; Victorius, 1557; Foulis, Glasgow, 1746; Schütz, Oxford, 1810; Butler, Cambridge, 1809-16; Wellauer, Leipzig, 1823-31; Scholefield, Cambridge, 1828; Paley, Cambridge, 1844-47, latest ed. 1870; Wecklein, Berlin, 1885-93; Eng. translations: Potter, 1777 (verse); T. A. Buckley, 1849; J. S. Blackie, 1850 (verse); Paley, 1864, 1891 (prose); Plumptre, 1868, 1873 (prose); Swanwick, 1873 (prose); Headlam, 1900 (prose); L. Campbell, 1891 (verse); G. Murray, 1920, 1923, 1925 (verse); R. C. Trevelyan, 1920 (verse). Verse translations of *Agamemnon* by Browning (1871) and FitzGerald; of *Prometheus Bound* by Mrs. Browning (1850).

Æsculic Acid, see ESCULIC.

Æsernia, see ISERNIA.

Æsculapius (called Asclepius by the Gks.) was the god of the medical art. According to Homer he was the 'blameless physician' whose sons were physicians in the Gk. army. The common story is that he was a son of Apollo, and was instructed by Chiron in the art of healing and in hunting. He healed the sick, and restored the dead to life, and was therefore killed by Zeus; but was afterwards placed among the stars. The chief seat of the worship of Æ. was Epidauros, whence it extended to Rome, 293 B.C. The Asclepiads (supposed descendants of Æ.) were an order of priests claiming a knowledge of medicine. Their prin. seats were Cos and Cnidus.

Æsir, see ASÆS.

Æsopus (Æsop), the celebrated author of the immortal fables inseparably connected with his name, lived during the latter half of the sixth century B.C. Traditionally a native of Phrygia, he is believed to have been a slave, being later set free. He visited Croesus and gained such favour that he was sent upon sev. important missions. Upon one of these errands he roused the priests at Delphi to such fury by his clever but blasphemous witticisms, that they flung him over a precipice. We gather from Aristophanes that the fables were popular in his time. While Socrates was in prison he rewrote those of the fables familiar to him, in verse. The fables themselves are believed to have been derived from very early sources, and they gain considerable value from a theory that some of them can be traced so far back as Buddha, in a collection of his birth-stories. The only Gk. version is that of Babrius.

Æstheticism. This word, which in its original and general sense implied an attachment to æsthetic principles, came to be applied particularly to a movement in art which in the seventies and eighties of last century was characterised by many

whimsicalities and absurdities. Arising from a natural and healthy reaction against the ugliness and philistinism of the mid-Victorian period, under Oscar Wilde and others it developed tendencies which justly made it the butt of much ridicule, drawing down on it the shafts of satire of Du Maurier in *Punch*; and W. S. Gilbert in his operetta *Patience*, 1881, ridicules one Bunthorne, who walked down Piccadilly, with a poppy or a lily in his medieval hand. But the saner adherents of the movement, such as Ruskin, Morris, Leighton, and the Pre-Raphaelite school of painters, did much to spread the appreciation of the artistic among their countrymen.

**Æsthetics** is the name given to that science or philosophy which treats of the beautiful and attempts to establish the principles and theories upon which works of art are based. The word is derived from the Gk. *αισθητικος* (that which concerns feeling or perception), and it was in Greece that the theories of *Æ.* were first propounded. As instancing the importance attached to this subject by the philosophers of classical antiquity, one recalls the amount of attention devoted to it by those twin giants of intellect, Plato and Aristotle. The name of Plato will always be remembered in all discussions on the nature of the beautiful, whilst Aristotle in his discourse on the theory of art in poetry, contained in his *Poetics*, contributed to æsthetic literature the most important work among the ancients. In it he treats of tragedy, a form of dramatic art carried to great heights by the dramatists of his time. His canons of criticism, many of which are still valid, include the assertion that beauty was the mean between 2 extremes, neither too large nor too small. Plato's teaching on the subject is in keeping with his general position, i.e. of an absolute and perfect ideal behind all appearance. From this it follows that beauty in finite things arises from their correspondence to their ideal archetype. This doctrine of Plato is expressed by the poet Keats in his *Ode on a Grecian Urn*, in which he expresses the opinion in the oft-quoted lines, 'Beauty is truth, truth beauty—that is all Ye know on earth, and all ye need to know.' The science of *Æ.* has been divided into subjective and objective. The objective side deals, *inter alia*, with the relationship of art to nature, the classification of the sev. arts, and the definition of their functions and limitations. Subjectively the question is one largely of psychology and an attempt to determine the nature and origin of æsthetic judgment or taste, and this dept. of the science is further subdivided into consideration of the conditions of artistic production and of artistic appreciation or perception. The latter aspect of the theory is put succinctly in the phrase that 'Beauty resides in the eye of the beholder.' The modern science of *Æ.* may be said to have been inaugurated by the publication in Frankfort at about the middle of the eighteenth century of *Æsthetica*, a book by Baumgarten, a

disciple of the Ger. philosopher Christian Wolff. In this work, which earned him the title of the father of modern *Æ.*, he differentiates between truth, which is apprehended by reason, and the beautiful, which is perceived by sense, which, he maintains, is on a lower plane of intellect. Following Baumgarten came a whole host of Ger. philosophic writers, who can only be briefly enumerated here. First comes Winckelmann, who developed Baumgarten's theories. Lessing in his *Laocöon* defined the spheres of poetry, painting, and sculpture. Schiller, the poet, who by influencing Goethe influenced the current of European thought, defined the secret of art as the super-session of the matter by the form. Kant denied the possibility of a strict science of beauty, as he regarded it as subjective. Fichte and Schelling, Herbart and Schopenhauer are the names of other Ger. æsthetic writers, the place of art being exalted in the latter's philosophy; but the colossal figure of Hegel dominates all, his *Lectures on Æsthetics* being the chief work on the subject. Eng. writers include Hume, Burke, Alison, and Ruskin, and the Fr., Diderot and Buffler; but, as will be seen by the space devoted to their writers, in the matter of *Æ.* the Ger. hegemony is practically unchallenged.

**Æstivation** (Lat. *æstivus*, belonging to summer), or **Prefloration**, in botany, is a term to describe the way in which the floral organs are arranged in the flower-bud, as veneration or prefloitation describes the arrangement of leaves in a leaf-bud. If the parts do not touch, the *Æ.* is *open*, if they touch but do not overlap it is *valvate*, if they overlap it is *imbricate*. When the *Æ.* is such that 2 parts overlap completely, 2 parts are completely overlapped, and 1 part overlaps at 1 edge and is overlapped at the other, it is called *quincuncial*; *convolute* or *contorted* when each part overlaps another and is itself overlapped at one edge.

**Æstivation** (Lat. *æstivare*, to pass the summer), or **Estivation**, in zoology, a state of dormant vitality in summer of some animals, such as land snails, in warm climates which prevents them from suffering from heat or drought. It is opposed to hibernation, which is a state of dormant vitality in winter.

**Astas**, the name by which the Negritos of the Philippine Is. are known among themselves. They are dwarfish in stature, with round heads, bulging foreheads, large eyes, and woolly hair, and are almost wholly uncivilised.

**Æther**, or **Ether**, a medium conceived as permeating all matter and space, the movements of which constitute the waves which give rise to the sensations of heat and light. The idea of an exceedingly tenuous medium pervading the whole universe has suggested itself to philosophers of all ages. In the Hindu mythology it is given as one of the 5 elements: earth, water, fire, air, and ether. Descartes elaborated a vortex theory of matter, in which he conceived all space to be filled with one substance

whirling round in great vortices. It was thus he explained the formation of the solar system, particles flying off from the centre to the circumference constituting the light radiated from the sun. Leibnitz in 1671 declared his belief in an  $\mathcal{A}$ ., a fine substance permeating all bodies in the direction of the earth's axis and producing the phenomena of gravity, elasticity, etc. Kant pub. in 1755 a thesis which postulated an  $\mathcal{A}$ . connecting all matter. It seemed necessary to him, in order to explain action at a distance, that bodies should operate upon each other by means of an elastic and subtle medium, uniformly diffused through the universe. This medium, he was convinced, was the underlying substance of heat and light.

The later development of the conception of an  $\mathcal{A}$ . occurred mainly in connection with the mathematical treatment of physical phenomena, particularly with regard to the propagation of light. Newton conceived light to be occasioned by particles moving with great velocity in straight lines from the source. He explained refraction by assuming periodic changes in the velocity of the light corpuscles; they have, he said, alternate fits of easy reflection and easy refraction, and it depends on which of these a particle is in when it reaches the surface whether it will be reflected or refracted. A ray of white light, he maintained, consists of many particles with differing periods of refrangibility and reflectibility, the most refrangible causing the sensation red, and the least refrangible producing violet. Newton objected to the wave theory held by Huygens and his supporters in that it did not explain the rectilinear propagation of light, or the phenomenon of double refraction. It was inconceivable, he also said, that a medium should be so transparent that light could reach us from stars known to be enormous distances away. Nevertheless the wave theory was to triumph; investigation of the phenomena of interference and polarisation (*q.v.*) led to them being explained by undulatory motion, so that the corpuscular theory hardly survived the eighteenth century.

In 1801 Thomas Young once more put forward the hypothesis that luminiferous  $\mathcal{A}$ . pervades the universe, that it is rare and subtle in a high degree, and that it is by vibration in this medium that light is propagated. The  $\mathcal{A}$ . was conceived of as offering no opposition to the passage of material substances; 'it passes through them,' he said, 'like the wind through a grove of trees.'

The existence of  $\mathcal{A}$ . had been assumed to explain light waves, it was therefore necessary, in order to avoid postulating different kinds of media, to discover some connection between light propagation and other physical processes acting through space. Faraday showed that iron filings spread on a card held over a magnet arranged themselves in a series of curved lines between the poles. These were called lines of force and indicate some disturbance or stress in the medium

connecting the poles of the magnet. He also showed that an electric current was induced in a continuous conductor cutting the lines of force. For years he attempted to discover whether magnetism had any effect on polarised light, until in 1845 he succeeded in producing the rotation of the plane of polarised light by transparent dielectrics in a magnetic field. Thus magnetic force and light were shown to have a relation to each other, and the  $\mathcal{A}$ . was now looked upon not only as the light medium, but as the medium of electric disturbances as well. Faraday's work was carried further by Clerk-Maxwell and Lord Kelvin. The latter connected magnetic force with a rotatory movement of the  $\mathcal{A}$ ., the energy of irregular translation constituting heat, the theory of the transformation of energy being thus considerably advanced. By calculating from the energy of solar radiation near the sun's surface, Kelvin obtained a value exceeding  $10^{18}$  for the density of  $\mathcal{A}$ ., that is to say, 1,000,000,000 cub. m. of  $\mathcal{A}$ . would have a mass of over 1 lb. The further investigation of mathematical values in connection with light-waves led Sir Joseph Larmor to the conception that  $\mathcal{A}$ . corresponds to a solid with a density considerably greater than any known substance and quite incompressible. To sum up: The  $\mathcal{A}$ . has long been regarded as the vehicle of light. During the nineteenth century it was regarded as the medium, filling all space, through which light, gravitational forces, and electro-magnetic waves were propagated; it was widely believed that the  $\mathcal{A}$ . was material, having the properties of matter, such as mass, rigidity, and motion. Matter itself was regarded as vortices in the  $\mathcal{A}$ ., but this view was abandoned as being illogical, since the  $\mathcal{A}$ . could not consist of vortices in the  $\mathcal{A}$ . Michelson and Morley in 1881 and 1887 attempted to discover the existence of an  $\mathcal{A}$ -drift at the earth's surface, and their experiments, which gave negative results, led to the principle of relativity. Sommerfeld says that 'nowadays we like to avoid speaking of the  $\mathcal{A}$ ., since the theory of Relativity has deprived it of its material existence in the older sense,' but, as Eddington points out, 'this does not mean that the  $\mathcal{A}$ . is abolished. It is agreed that the  $\mathcal{A}$ . is not a kind of matter, and, being non-material, its properties are *sui generis*—it has definite characters of its own.' Sir Oliver Lodge indicates some of its properties: it fills all space in the most thorough manner, it is absolutely cold, it is absolutely transparent and undispersive, it is devoid of viscosity, it is the sole vehicle of radiation, i.e. of light, X-rays, wireless waves; electric and magnetic fields are forms of energy existing in the  $\mathcal{A}$ ., and since all varieties of matter are ultimately electrical in origin, being composed of protons and electrons, Lodge asserts that 'the  $\mathcal{A}$ . is indirectly responsible for all physical and chemical activity. What other functions this universal medium may be found to possess, and whether life and mind can be in any way associated

with those functions, it must be left to posterity to find out.

**Æthicus**, see **ETHIUS**.

**Æthiopia**, see **ETHIOPIA**.

**Æthophyllum** (Gk. αἶθος, flame, φῦλλον, leaf), a name given by Brongniart to a fossil genus of palms.

**Æthusa**, the anct. name of Favignana, the largest of the Ægadian Is., in the Mediterranean. It is 6 m. long, and has a pop. of 7000.

**Ætiology**, see **ETIOLOGY**.

**Aetion**, or **Eetion**, a Grecian painter b., according to Pliny, 350 B.C. References are made to him by Cicero, Pliny, and Lucian. He was contemporary with Alexander and Apelles. His chief work represented the marriage between Alexander and Roxana. At an exhibition in the Olympic games he won the admiration of the president, who was sufficiently struck by his work to give him his daughter in marriage.

**Aetius**, 'the Atheist,' a native of Coele-Syria, flourished in the fourth century A.D. After following various trades he became a doctor. He gained distinction particularly in medical controversy. Leontius of Antioch installed him deacon, but his heterodox views caused his banishment from the tn. In 358 A.D. he went with Eunomius to Alexandria, only to be sent into exile by Constantius. He was recalled by Julian, and elevated to the rank of bishop. Here he used his influence on behalf of Arianism. He retired upon the succession of Valens, and d. in 367. A work of his that survives, called *De Fide*, attacks the doctrine that the Son is God, on the ground that the fact of being begotten destroys the nature of a god.

**Aetius** (c. 390-434 A.D.), a Rom. general who lived during the latter period of the W. Empire, b. in Moesia. He passed his early life as a hostage among the Goths and Huns, using afterwards his intimate knowledge of them to their ultimate defeat. In 424 he invaded Italy at the head of over 50,000 Huns to support Joannes, the proclaimed emperor. His intrigues directed against Count Boniface, his rival, caused that dignitary to revolt. The battle that followed saw the count's death and the triumph of A., who now rose to be the most conspicuous figure of the W. Empire. Most of his military glory had been won in Gaul. His greatest victory was at Châlons-sur-Marne, 451, when he led the Gauls against the Huns. He was killed by the emperor Valentinian, who suspected him of complicity in an attempt to overthrow him.

**Ætna**, see **ETNA**.

**Ætolia**, a prov. of N. Greece. It is divided into 2 natural divs. by the basins of the Lower Archelous and the Evenus. Among the mts., many of which rise above 7000 ft. above sea level, is Kiona. The soil is agriculturally rich; currants, vines, maize, and tobacco being cultivated with ease in the S.W. plain. The chief tns. are Missolonghi and Lepanto. In the early hist. of Greece, the *Ætolians* played a prominent part. The

country was created primarily to safeguard an attack from the Macedonians, and rapidly rose to a high position controlling almost the whole of Greece. The Macedonians, however, gradually weakened their forces, till, after the disastrous conflict with the Romans, their power had almost been sapped away. In the fifteenth century Æ. was brought under Turkish control. To-day with Acarnania it forms part of the kingdom of Greece. The N. region is wild and barren, the only inhabitants being Vlach shepherds. Area 3020 sq. m. Modern prov. is Acarnania and Æ.; pop. of prov. 220,000.

**Ætolikon**, see **ANATOLIKO**.

**Afer**, **Domitius** (16 B.C.-A.D. 59), Rom. orator, was b. at Nemausus (Nîmes), and became the preceptor of Quintilian. Under Tiberius he betrayed to death Claudia Pulchra and Q. Varus, and in Caligula's reign he was made consul. He d. of over-indulgence. See Tacitus, *Annales*, iv. 52; xiv. 19; Quintilian, v. 7.

**Affettuoso**, an It. musical term, indicating that a passage should be played with feeling, in a movement between *adagio* and *andante*. *Con affetto* is used alternatively with this term.

**Affidavit**, a statement of facts in writing made upon oath, or by a solemn affirmation, before a magistrate or commissioner for oaths. The word is derived from the old Lat. form of a declaration on oath, which commenced thus, 'Affidavit M. N.' i.e. 'M. N. has sworn.' The employment of A. is generally confined to litigation, but sometimes the A. is employed to lend force to a public statement, for the person who knowingly and advisedly falsely swears to an A. is liable to punishment for perjury. In judicial proceedings the A. is used in lieu of oral evidence, and particularly is this the case in interlocutory applications. Sometimes the whole of evidence may be taken by A., and this was especially the case in the old Chancery courts, but as a rule this practice is discouraged.

**Affiliation**. An A. order is an order made by an Eng. court of summary jurisdiction at the instance of the mother of an illegitimate child, or by the public assistance authority where the child becomes chargeable to the parish, ordering the father to pay a sum not exceeding 20s. a week for the maintenance and education of the child until the age of 16. The process is governed by the Bastardy Acts, 1845, 1873, and 1923, and the Affiliation Orders Act, 1914. The uncorroborated testimony of the mother is not sufficient proof of paternity, and an appeal to the quarter sessions may be made. Failure to comply with an order is punishable by imprisonment.

**Affinity**, in law, relationship through the fact of marriage. On the principle that man and wife are one flesh, one party to a marriage bears to the relatives of the other party a relationship by A. which is determined by the latter's blood-relationship, or *consanguinity* (q.v.). A. is only important in connection with the marriage law, which in England and



Scotland is based in this respect on the Mosaic law as set forth in Lev. xviii. An important exception to the general rule that marriages are prohibited within the same degrees of A. as of consanguinity is provided by the Deceased Wife's Sister Act of 1907, which allows marriage between a man and a woman standing in that relationship. The objections to marriage within certain degrees of A. as distinct from consanguinity rest mainly on religious grounds; scientific observation having disclosed no reason for supposing that such marriages would result in degeneration.

**Chemical A.**—The property in virtue of which atoms or groups of atoms tend to enter into chemical combination with other atoms or groups. See CHEMISTRY, ELECTROLYSIS, VALENCY.

**Affirmation**, a solemn declaration prescribed by the Oaths Act of 1888 as a substitute for an oath in all cases where for conscientious reasons a person objects to being sworn. An A. in court is subject to the same liabilities for perjury as an oath. The privilege of affirming was first granted to the Quakers in William III.'s reign, and gradually extended to other categories of people. See OATH.

**Afforestation** (*from* Lat. *ad*, to, and *Low Lat. forestis*, unenclosed). The planting of trees in sparsely wooded districts for the purpose of converting them into woods and forests. The science dates from the eighteenth century, when the depletion of forest lands resulted in a serious shortage of timber. During recent years the system has received much impetus from a more intelligent recognition of its significance, and Sir Henry Rider Haggard was responsible for much of the progress it has made as a science. He was appointed a member of the Royal Commission on Coast Erosion and A. in 1906, a body which has considerably furthered the interest now shown in A. The steady migration of the rural pop. to the large industrial centres, the damage caused by deer and hares, the clearances which take place to render accessible for gaming purposes our forests, emphasise the urgency and value of A. as an economic factor. The science was most thoroughly carried out by Germany and Switzerland, but the replanting of forest lands on a large scale is a development of the twentieth century. The chief cause of failure and difficulty of operation has often been the lack of co-operation between theorising experts and practical forest men. From such co-operation it is now recognised that a foreseen shortage in the output of coniferous timber is only to be counteracted by the application of such a scheme. To indicate clearly just what considerable benefits would accrue from A., it has been shown on trustworthy evidence that our own shortage of supply and inferiority of quality could be so improved that where we import at the present time between £45,813,197 (in 1945) and £52,381,816 (in 1946) annually of timber, that tremendous quantity could for the most part be cultivated within England itself.

Reliance, however, is placed chiefly on Canada, Sweden, Finland, and U.S.A. (in that order).

In 1909 provision was made in the Budget of that year for the establishment of a body of commissioners 'to develop some of the neglected resources of the country,' £200,000 being ear-marked for this purpose. The development commission made tentative beginnings by the purchase of land in Scotland and Ireland. Subsequently, owing to the lack of skilled labour, the commissioners concentrated on founding centres for instruction in forestry. The lack, in the United Kingdom, of the State co-operation which in Germany and the U.S.A. have for long been given to forestry, is shown by the fact that only about 4 per cent of the country is under timber, and supply necessarily depends on the activities of private landowners. The scarcity of home-grown timber was acutely felt in the First World War, and high prices had perforce to be paid for imported timber. But even before the war a tentative beginning was made in 1913 by the establishment of forestry branches by the Board (now Ministry) of Agriculture and the (former) Office of Woods, whose expenses were defrayed from the fund created by the Development and Road Improvement Funds Act, 1909. But it required nothing less than the extraordinary demands on home-grown timber during the war to awaken the legislature to the urgency of the problem. The reconstruction committee, through a forestry sub-committee, recommended a national policy of A., and in 1918, pending legislation, an interim forest authority was appointed as the preliminary to a permanent authority. In 1919 the Forestry Act was passed to provide for the acquisition and A. of land in the United Kingdom so as to be independent of foreign supplies in an emergency up to a period of 3 years. Later a forestry commission was set up and given wide powers for promoting A. in the United Kingdom. The commissioners are empowered to buy or lease land, advance loans, or make grants to encourage A., whether by local authorities or private owners. Expenses are met from a forestry fund, provision for which was made by payments up to £3,500,000 during 10 years from Apr. 1919. The Forestry Act 1927 authorised an increase of the number of forestry commissioners and empowered them to make by-laws with respect to land vested in them or under their management or control. By the combined operation of the Forestry Acts 1914-27 the commissioners are charged with the general duty of developing A., and promoting the production of timber in Great Britain. Together with the former Crown woods, transferred to the Commission in 1921, the forestry commission have acquired 1,415,000 ac. of land—80 per cent being plantable and over 479,000 ac. have now been planted, including land in the Esk and Uddon valleys. A. plans in the Lake district,

however, have given rise to much controversy and opposition. Some 6000 ac. have been planted in the special areas of Durham, Tyneside, W. Cumberland, Halthwistle, and S. Wales. In 1939 receipts from all sources, including forest produce, rents, mines, and minerals, amounted to £225,000 a year. Of the land in the United Kingdom suitable for A., about 50 per cent is in Scotland, where the commissioners hold 354,000 ac. of plantable land. The commission have (1945) proposed that the United Kingdom should have 5,000,000 ac. of forests in 50 years, and planned to plant 1,100,000 ac. in the first 10 years.

**Affre, Denis Auguste** (1793-1848), archbishop of Paris, b. at St. Rome-de-Tarn. Educated at St. Sulpice, he became in 1818 prof. of dogmatic theology. As archbishop he endeavoured to establish peace between the soldiers and insurgents during the rebellion of 1848. Wearing a green branch to denote his peaceful intentions, he mounted a barricade. He was killed by a stray bullet. Among his works are many valuable treatises and an *Essai sur les hiéroglyphes égyptiens* (1834), where he showed Champollion's system of translation to be faulty.

**Affreightment**, see BILL OF LADING; CHARTER-PARTY.

**Afghan Hound**, a native of Afghanistan, where it has been used for centuries as a hunting dog and guard. Rock carvings of 2200 B.C. show the dog in the same form as it is now known. It was introduced to England and shown for the first time in 1907. In build it resembles a greyhound, but appears shorter and heavier on account of the long shaggy coat which covers flanks, shoulders, hindquarters, and legs. The smooth muzzle of the long narrow head is in strong contrast with the silky top-knot surmounting the skull. The ears are heavily feathered and carried close to the head. Legs are straight and well-boned; the sprightly ringed tail has a curl at the end. The A. H. is intelligent, but shy with strangers. It is hardy, and is essentially an outdoor dog; it should not be kept in towns or in small houses. According to official standards the height at the shoulder for dogs is 27-28 in., and for bitches 24-26 in. A number of colours are found, but cream, fawn, golden, or red are preferred; the nose is black in all but light-coloured dogs, which may have a brown nose.

**Afghanistan** is a country situated at the N.W. of India. Placed between Asiatic Russia and India, it owes its importance politically to its position as a 'buffer' state between the 2 regions. It is bounded on the W. by Iran (Persia), on the S. by Baluchistan, on the N. by Asiatic Russia, and on the E. by the N.W. Frontier Prov. The N. boundary runs from Zulfikar on the Iranian frontier to Kushk, the Russian railway terminus on the branch line from Merv, and thence to the Oxus. The Indo-Afghan frontier was settled by the Durand agreement of 1893. It extends 400 m. from N. to S. and 600 m. from E. to W. The 5 major provs. of A. are Kabul, Mazar, Kandahar,

Herat, and Qataghan-Badakshan. Its area is approximately 245,000 sq. m., being twice the size of Great Britain and Ireland. Pop. (estimated) 11,000,000.

The mt. system of A. contains the Hindu Kush range, with its continuation the Koh-i-Baba and the Firozkoh plateau. Of the Koh-i-Baba peaks, Shah Fuladi (16,870 ft.) is the highest. Next in importance to the Hindu Kush and Turkestan mts. are the Safed Koh, whose highest peak is Sikaram, which is 15,600 ft. above sea level. The rivs. may be divided into the 3 prin. basins of the Oxus, Indus, and Helmand. In the Oxus basin the Murghab and the Hari-Rud owe considerable value to their geographical position, as well as to the richness of their valleys. Before, however, these rivs. reach the Oxus, they disappear. Indeed, of the many streams that flow from the N. slopes of the Hindu Kush, only 2 reach the Oxus, these being the Kokcha and the Kunduz. In the basin of the Indus are the Kabul and its tribs., which flow from the S. slopes of the Hindu Kush and the valleys of the Safed-Koh; the Kuram, and those streams flowing from the Waziri Hills and the Sulaimans. The Helmand, fed by the Argandab, the Tarvak, and the Afghastan, waters the whole of S.E. A.

The climate, owing to the different altitudes, is very varied, and suffers sudden and severe extremes. The temp. for the greater part of the year changes through the extraordinary range of 30° in a day. In the N. the winter is marked by a lasting and rigorous severity; while in the Oxus country the heat of summer reaches 120° F. To the severities of the intense heat are to be added the frequent dust storms and fiery winds; while the night-time is rendered almost intolerable by the radiating heat absorbed during the day by the vast masses of rock. The most temperate region is at Herat. Generally the climate of A. may be said to be dry, whatever rain it receives being derived from the S.W. monsoon. From the athletic and handsome appearance of the pop. it would be expected that healthy conditions prevailed. But the existence of frequent and intermittent fevers, and the almost universal suffering from bowel complaints, rendered easy by the too heavy abuse of a rude diet, prove very costly to life.

The Afghan peoples are made up of very diverse elements—Pathans or Afghans proper ('the children of Israel') in the E. and S. provs., Tatar Hazaras in the centre; a few Persians in the W., and Tajiks, Uzbeks, and other Turki tribes in the N. up to and well within the Russian boundary. The religion throughout the whole of the country is Mohammedan. Although Pushtu is the prevalent language, that of the court and Afghan literature is Persian. The literature of the country is significant enough to be given the name, most of it being poetry, especially of the ballad kind. The best-known poets are Abd-ur-Rahman (seventeenth century) and Khushal Khan, of the time of Aurungzebe. The laws of A.

are founded on the 'Sharlat' or Islamic law, and on tribal custom. Education, once so primitive, is being developed, there being some 3 colleges in Kabul, which use Eng., Fr., and Ger. media of instruction respectively, and a large number of middle and primary schools in the provs.

A. is ruled by an absolute monarch, the king (once amir), whose successors claim accession by right of heredity. Under the constitution of 1931, there is a Senate of 43 nominated members and a National Assembly of 110 elected members, with a Grand Assembly (*Loe Jirgeh*) which is summoned on important occasions. The administration is vested in a Council of ministers. The Afghans claim descent from King Saul, calling themselves 'Beni-Israel' (children of Israel). As a people, the Afghans are of dignified and noble bearing. Their predominant character is keen and acutely developed treachery and cunning. Travellers are regarded with suspicion, the imposition of taxes and the punishment of crime as tyranny. Their chief occupation is agriculture.

The land, if well cultivated, would be rich in yield. The natural productions of A. include castor oil and tobacco from Kandahar, wheat, barley, cotton, grapes, melons, and the mulberry from Herat. The ash and elm are grown, and the apricot, apple, plum, quince, peach, and pomegranate the prin. fruits, a branch of cultivation which absorbs considerable attention. In some parts the pistachio, valuable for its dyeing qualities, is cultivated. Over 100,000 ac. are under irrigation from canals and *karez* or underground channels fed from springs. The farmer still, for the most part, ploughs with a trivet of sticks and reaps with a 15-in. sickle. The prin. revenue is from the land—the State's age-old share of the crop throughout all Asia; in A. it is from one-tenth to one-third of the gross produce, though un-irrigated land is scarcely taxed at all. Salt, copper, silver, lead, coal, iron, lapis lazuli, and rubies are found. Industrially, the chief articles manufactured are carpets, *poshtins*, i.e. clothing made from sheepskin, and cloth materials from the many varieties of goat-hair. Silks are manufactured at Herat and Kandahar, which tuss. owe their importance to this industry. Exported to India by the Kandahar route are mainly timber, fruits, carpets, raw wool, skins, and ghee, *asafoetida*, and tobacco. Imports include cotton goods, sugar, and tea. All the carrying was, until fairly recent years, done on the backs of camels and ponies, and even that crude system of transport suffered from misgovernment and constant warfare; but to-day a number of the roads are fit for motor traffic except after heavy rain and snow, and though goods are still conveyed by pack animals, motor transport is rapidly supplanting pack transport as the chief means of conveyance. The prin. trade routes from A. to India are those connecting the Oxus regions with Kabul, and

those which lead from Kabul, Ghazni, and Kandahar to the Indian plains.

The early hist. of A. is so involved in obscurity, and records of its development contain so many conflicting attempts to fix its authenticity, that, until the middle of the eighteenth century, little matter definitely concerning its past exists. As has been stated before, the Afghans claim descent from Saul, though their heredity is traced more directly from Kais, a wise man who led a band of men, representing the Afghans, to seek Mohammed in quest of information concerning his message. The observations of many officers who have spent a considerable number of years among the Afghans, besides the indication in their physiognomy of Heb. descent, tend to confirm the theory of the descent from Saul.

A. began its existence as an independent country with the reign of Ahmad Shah, who was chosen leader by the Afghans, then serving under Nadir Shah, on his assassination. He called himself king of the Duranis, a clan which is uppermost in A. to-day. He extended his dominions very considerably, and at the battle of Panipat (1761) he defeated the supposed invincible Mahrattas with crushing effect. In 1773 he d., leaving his kingdom to his son Timur. During his reign extreme conditions of utter lawlessness demanded his incessant exertions. He d., leaving 23 sons, the fifth of whom, Zaman Mirza, captured the royal position. As was to be expected, strife between the numerous aspirants to the throne waged with barbarous ferocity. Out of the turbulence Kamran gained the coveted position. In 1831 the Persians besieged Herat, and the Russian attitude rousing anxiety, Sir Alex. Burnes was sent to be a resident in the amir's court. The Afghans, however, made terms impossible of acceptance, and, as a result, the first Afghan war was commenced in 1838. Shah Shuja, who had taken refuge, on his fall from power, in Brit. ter., was reinstalled at Kabul. Violent eruptions of insurrection, however, broke out, and found a vent in the massacre of the Brit. officers at Kabul in 1841. A series of calamities followed, resulting upon the many disadvantages which the Brit. experienced. In order fitly to punish these offenders, speedy preparations were made, and Shah Shuja was once more placed on the throne. The position, however, was fraught with many dangerous possibilities. It was natural that the Afghans should resent the action of the Brit. in placing above them a ruler whom they detested, and the native temperament, quick as it is to revolt against the slightest element of compulsion, only served to augment the bitterness of their hostility. For a time a policy of non-interference was maintained. The disaffection, seething in the Afghans, led to the ready alliance of their forces with those of the Sikhs against the Brit. In 1849, the combined forces were totally defeated by Lord Gough at the battle of Guzerat. A treaty was

concluded in 1855, followed by the death of Shah Shuja 8 years later. Of his many sons Shere Ali Khan was willingly recognised as ruler for a time. Disagreement speedily arose, and a state of anarchy followed. During the strife the amir suffered the loss of his favourite son. This bereavement affected him so severely that all active interest in this condition of uncertain and troublous warfare was destroyed. It was not until Kabul was captured, and his dominance in other parts almost entirely alienated, that the Amir Shere Ali began definite operations. For some time, in spite of extraordinary determination and perseverance, he suffered continual defeat. Finally, however, in 1868 he was once more in possession of Kabul. In this ultimate success he was aided by the viceroy of India, Sir John Lawrence. In 1869, he was informed that the Brit. Gov. intended no further interference with A. affairs, save in the event of a civil war. It was made clear that Brit. influence was intended for the securing of the peace and well-being of the country.

In 1870 Ali's eldest son, Yakub Khan, rebelled against his father. He had distinguished himself by talent and ability to an exceptional degree. In spite of his efforts he was imprisoned 4 years later. Abdulla Jan was proclaimed heir apparent. Following this period a coldness had grown between Shere Ali and the Brit. Gov. Russia began overtures, and in view of the seriousness of possible developments a Brit. mission was suggested, to make a pacific visit. The amir's refusal to receive the deputation led to the outbreak of the second Afghan war. A greater degree of success attended Brit. efforts, and by the end of 1878 the amir had fled the country, after the capture of Kandahar and Jalalabad by the Brit. forces. He d. in the following year at Maga-i-Sharif. His son Yakub Khan succeeded him, and signed a treaty with the Brit. at Gandamak. This agreement contained the following conditions: 1. A Brit. representative to take up residence at Kabul. 2. The guarantee of Brit. assistance in the event of collision with foreign powers. 3. A subsidy to be granted to the amir. 4. Kuram, Pishin, and the Sibi valleys to remain under Brit. control, for the purposes of developing a frontier defence for India. A settlement followed, though of short duration, for, 6 months later, the amir's troops, in a state of revolt, surrounded the Brit. residence. A bloody massacre was perpetrated in spite of a determined resistance. Punishment followed in the defeat of the Afghans in Sir F. (later Lord) Roberts at Charasia, and possession was taken of that city. Yakub Khan abdicated, placing himself under Brit. protection. Speedily fresh troubles arose in the rebellion of the tribes. The Brit. were held up at Sherpur until Gen. Gough relieved them. In 1880 the ex-amir's brother Ayub, filled with a spirit of righteous fanaticism, proclaimed a holy war (*ghaza*) upon

the Brit. At Malwand he completely defeated Gen. Burrows. A further loss followed when Brooke was forced to retreat before the religious frenzy of Ayub, suffering heavy losses. Kandahar was now besieged. Sir F. Roberts, however, severely repulsed Ayub Khan and once again estab. Brit. rule in S. A. It was resolved now to evacuate Kandahar, whereupon Sirdar Shere Ali, perceiving his helplessness, withdrew to India. Meanwhile, learning of the Brit. evacuation of Kandahar, Ayub once again advanced upon the city. It was not long in falling into his possession. The Amir Abd-ur-Rahman, however, prompted by the loss, summoned sufficient determination to succeed in recapturing the town, in destroying the army of Ayub Khan, and in fixing once more his position as amir. In 1884 the demarcation of the N. Afghan boundary continued under Brit. and Russian co-operation, in an atmosphere of contention and constant disagreement. By 1891 Abd-ur-Rahman had strengthened his position to a degree more considerable than the preceding years had known. A period of rigorous administration saw the imposition of increased taxes, the organisation of a standing army, and the destruction of the power enjoyed so long by the many neighbouring tribes. His death in 1901 brought to an end a reign wherein complete reform had taken place, though at the cost of cruel and harsh measures. Habibullah succeeded him.

He began his career with universal acclamation, and ensured that popular reception by his relations with outstanding tribes and the organisation of his army. He arranged for representation of each tribe in a tribal council for the settlement of inter-tribe disputes. In his foreign policy he followed the example his father had set. In return for Brit. assistance in the event of foreign aggression, he promised to abide by Brit. advice referring to questions of external affairs. This agreement he faithfully observed, and those questions which arose from Russia's relations with bordering provinces he referred to India. Overtures made by the Indian Gov. were received with coldness, and all attempts to alter the terms of the agreement met with little encouragement. True to the traditions of his race, all ventures that tended to increase the cordiality of his relations with India failed to arouse any response. It became necessary that he should have access to the highest Indian experts and authorities, and to that end a meeting was proposed between a Brit. mission and the amir. A series of dilatory and hesitating replies indicated his attitude towards the movement. However, in a few months he finally gave his consent. No actual change occurred from the meeting, the only benefit that resulted being the more strongly binding nature of the previous arrangement of 1880. Later, however, a meeting was successfully convened between the viceroy and the amir, to the satisfaction of both sides. But throughout all his dealings of

a diplomatic nature the amir evinced a tendency to independence and a wish for practical isolation.

The Amir Habibullah Khan was assassinated in 1919. Thereupon his brother Nasrullah seized the reins of power, but was deposed by Amanullah, the third son of Habibullah. Amanullah's troops crossed the frontier of India in May 1919, but were speedily repelled by the Brit. troops, who advanced to Dakka, thereby compelling the amir to conclude peace (Aug.), but with a recognition of Afghan independence. In 1921, a treaty was signed at Kabul by which Great Britain recognised the internal and external independence of A., and A. accepted the then-existing frontier between India and A. subject to a slight adjustment near the Khyber. It was also mutually agreed to interchange diplomatic representatives, including consular officers at Delhi, Calcutta, Bombay, and other tns. By the same treaty A. was permitted to import free of duty such war material as might be necessary to her defence. In 1923, a trade convention was concluded, and though there is no exact information of trade statistics, it is estimated that the exports and imports between India and A. are of the average annual value of £1,000,000, exports from India being chiefly cotton goods and sugar, the imports being timber, grain (especially pulse), drugs, and cattle. In 1928 King Amanullah and his queen paid a state visit to Europe, visiting Italy, France, and Great Britain. Everywhere they were cordially received, and presents showered upon them, mainly with the object of securing concessions in A. and of furthering divers political interests. Amanullah manifested considerable diplomacy in promising much and doing little, his dominant idea being to westernise his kingdom and to give most, no doubt, to the country which should render him the greatest benefit in this direction. He also concluded treaties of goodwill with Turkey and Persia, by which the different signatories agreed to adopt a conciliatory attitude towards each other in the event of disputes. On reaching his own country again, many reforms were put in train. Afghan students were sent to Europe to study modern methods of army administration and military training, political science and engineering, and a comprehensive programme of public works embracing railways and telegraphs and an aeroplane service was planned at enormous expense for so poor a state. But perhaps the most striking reform initiated was the emancipation of women through the zeal of Queen Souriyah, who, being a woman of Damascus, was not slow to appreciate the backward state of the women of her royal consort's country. European dress was also adopted by the king's council, even to the familiar European bowler hat. Still more ambitious reforms were the decrees of the king for the abolition of titles of nobility and the curtailment of the powers of the religious leaders, together with a bold

attempt to introduce Cabinet gov. It is not easy to say which of these drastic reforms caused the most unrest among the tribesmen, but the removal of the veil in public and the education of girls soon inflamed public opinion to danger point. The direct cause of the revolt which followed this westernising zeal, however, was the royal order to all tribesmen to become naturalised citizens of A., and under the lead of the Shinwari tribe, supported by the incensed Moslem priesthood, armed rebels were soon mustering for a general attack. The situation in Kabul became so critical, in spite of the initial defeat of the rebels by the king himself, that all European residents were evacuated by aeroplanes sent out from Brit. India. Amanullah's position grew steadily worse during the autumn of 1928. His capital was isolated and severe damage done to numerous buildings. He removed his court to Kandahar and, in a despairing effort to save his crown, deemed it advisable to recant his European doctrines by recalling the Afghan students and giving orders to foreign legations to leave the country. But it was too late, and in 1929 he abdicated in favour of his elder brother Inayatullah. But when the new king abdicated in his turn, Amanullah rescinded his abdication. Meanwhile the rebel leader Bacha-i-Saqao, under the name of Habibullah Khan, had usurped control at Kabul. Amanullah met with no better fortune, and in May fled with his wife and brother to Bombay, whence they journeyed to Europe. In Oct. Habibullah, defeated in his turn, fled from Kabul, which fell to Nadir Khan, former war minister under Amanullah, who later was elected king. This monarch was recognised by the Brit. Gov. and his position seemed to be comparatively secure, but he was murdered in 1933 and the new king, his son, Zahir Shad (b. 1914) was proclaimed king in his stead. The new fundamental law, made in Nadir Khan's reign, declared A. to be completely independent and, under the same law, slavery and forced labour were abolished and education made compulsory. A. was admitted to membership of the League of Nations in 1934, mainly at the instance of Russia and Turkey. In July 1937 A. signed, with Iran, Iraq, and Turkey, a pact of mutual non-aggression (treaty of Saadabad). In 1938 the Afghan air force was considerably expanded and work began on the building of military aerodromes at Herat, Kandahar, Muzar-i-Sharif, and Jalalabad. Plans for the industrialisation of the country were developed in 1939 and already cotton and other textile factories have been opened; while efforts are being made to exploit the almost untapped mineral resources of the N. part of the country. In 1946 A. applied for admission to the United Nations Organisation and was admitted.

Afium Kara Hisar, or Afiorin Kara Hisar (Opium Black Castle), a tn. in Anatolia, Asia Minor, on the route between Smyrna and Armenia and Persia. It contains beautiful churches and mosques.

Its chief trade is in opium, but it manufs. firearms, woollen and cotton goods, felts, and tapestry. Pop. 20,000. In the Greco-Turkish War, 1921-22, the Gks., heavily defeated in Sept. 1921, retired on Eskischir and repulsed Turkish attacks at A. K. H. in Oct.

**Afragola**, a tn. near Naples, Italy, noted for its wine and its straw goods. Pop. 24,000.

**Africanus**, Lucius (fl. c. 100 B.C.), a Rom. comic poet, playwright, and orator, who was the first to give up imitation of the Gks. in depicting Rom. life. His extant works are only fragmentary, and have been collected by Otto Ribbeck in *Comitorum Romanorum Fragmenta*, 1898.

**Afreer** or **Afrir**, see **IFRIR**.

**Africa** is one of the 5 continents, and belongs to the 'Old World,' being connected with Asia by the isthmus of Suez, and separated from Europe by the Mediterranean Sea. The name Africa was first given by the Romans to their African provs. with the city of Carthage, and it has since been extended to the whole continent. Both Gk. and Rom. writers called this continent Libya, and Herodotus (b. 484 B.C.) and Ptolemy (fl. A.D. 139) in their works give us information about this land. In the seventh century the Arabs were acquainted with the country S. of the Great Desert, and the Arab geographers, the chief of whom are Edrisi, Ibn Batuta, and John Leo (Leo Africanus), have left records which, though often vague and unsatisfactory, show a more extensive knowledge of A. than that possessed by the Gks. and Romans. In the fifteenth century the Portuguese made discoveries along the N.W. coast, reaching between 1467 and 1494 as far S. as Sierra Leone, Fernando Po, Cape St. Catherine, and the Congo. In 1487 Bartholomeu Diaz discovered the Cape of Good Hope, or, as he called it, the Cape of Storms; and in 1497 Vasco da Gama discovered the Cape route to India. The Portuguese soon made journeys into the interior, and during the sixteenth and seventeenth centuries settled along the E. coast. During the sixteenth century the Fr. sent ships to the R. Gambia, and during the end of the seventeenth and the beginning of the eighteenth century they opened up the country of the Senegal, estab. commercial factories, discovered Bambuk to be rich in gold, and obtained new information about the Niger and Timbuktu. The Dutch, the Danes, and the Eng. then commenced to explore. Mungo Park made journeys in 1795, 1796, and 1805, discovering new land around Timbuktu, and sailing down the Niger. At the beginning of the nineteenth century various discoveries were made by Tuckey, Peddie, Campbell, Bowdich, Mollen, Ritchie, Lyon, and Laing. In 1822 Denham and Clapperton set out from Tripoli and reached Lake Chad; Laing and Callie reached Timbuktu; and Richard Lander reached the mouth of the Niger in Nov. 1830. About the middle of the nineteenth century expeditions were made to Abyssinia,

the Upper Nile valley, and N. A., and about the same time attention was turned to S. A. David Livingstone reached Lake Ngami, 1849, went northwards up the Zambesi, and explored the regions round Lakes Nyasa and Tanganyika from 1859 to 1873. Burton and Speke discovered Lake Tanganyika, 1857, and Speke discovered the S. part of Victoria Nyanza. In 1860 Speke and Grant went up the White Nile and reached Gondokoro, and Baker discovered Albert Nyanza. Barth, Gustav Nachtigal, and Schweinfurth explored E. Sudan from 1850 to 1870. Cameron made discoveries in the Congo basin, and Stanley, after exploring the regions around Lake Tanganyika, arrived at the mouth of the Congo in 1877. Serpa Pinto, Thomson, Johnston, Grenfell, Pogge, Wolf, and Wissmann made many discoveries during the latter part of the nineteenth century in the basins of the Nile and Congo. N. A., especially the dist. between Morocco and Timbuktu, has been explored by Oscar Lenz. Crogan and Sharp traversed A. from the Cape to Cairo in 1901.

**Boundaries, Size, and Coast-line.**—A. is bounded on the N. by the Mediterranean Sea, on the W. by the Atlantic Ocean, on the S. by the Indian Ocean, and on the E. by the Indian Ocean and the Red Sea. Its greatest length from N. to S. is 5000 m., and its breadth from Cape Verde to Ras Hafun is 4650 m. Its area, including Madagascar and the other adjacent is., is nearly 11,500,000 sq. m., or 3 times that of Europe. The coast-line is regular, with no deep seas, bays, or riv. estuaries of any size to afford climatic or commercial advantages; so that in proportion to its size A. has less coast-line than any other continent, its total length being about 16,000 m.

**Islands.**—A. has very few is., and they are all small with the exception of Madagascar (228,000 sq. m.) which is one of the largest in the world. In the N. Atlantic are the Madeira Is. (Portuguese), the Canary Is. (Sp.), and Cape Verde Is. (Portuguese). Fernando Po (Sp.), Prince's Is. (Portuguese), St. Thomas (Portuguese), and Annobon (Sp.) are 4 volcanic is. in the gulf of Guinea. St. Helena and Ascension (Brit.) are solitary rocks in the Atlantic. On the E. in the Indian Ocean are Madagascar (Fr.), Mauritius (Brit.), Bourbon or Réunion (Fr.), the Seychelles, Amirante, and Aldabra (Brit.), Comoro (Fr.), and Zanzibar (Brit. protectorate); and further N. is Socotra (Brit.), and in the Red Sea are Perim and Dahlak.

**Surface.**—The continent is an enormous plateau with terraced tablelands rising one above the other, terminating in the rugged mts. of the M., where the Nile and the Congo take their rise. The interior plateau is bordered by mt. ranges which run parallel with the coast and descend in terraces to it. The Great Desert or Sahara is shut in between the Atlas Mts. on the N. and the S. Plateau, and the Congo basin occupies the W. part of the peninsula. The S. Plateau is much

higher than the N., having an average elevation of nearly 4000 ft.

**Mountains.**—The mts. of A. may be divided into 3 distinct systems: 1, the Atlas; 2, the W. Coast, and 3, the E. Coast.—1. The Atlas Mts. occupy the N. portion between the sea and the Sahara, from Wadi Daa to Cape Bon. The E. portion, from 6000 to 8000 ft. high, consists of 2 parallel ranges enclosing a plateau where salt lakes called shotts are found. The W. portion, known as the Great Atlas of Morocco,

and the Great Lakes. Killimanjaro, 19,500 ft., and Mt. Kenya, 18,000 ft., are extinct volcanic peaks. The Livingstone Range, near Lake Nyasa, is 11,000 ft. high; the Ruwenzori Range ('Mountains of the Moon'), between Lake Albert and Lake Edward, is from 16,000 to 20,000 ft. high; and Mt. Mfumbiro, between Lake Albert and Lake Victoria, is 11,000 ft. high. (c) The Abyssinian System rises abruptly from the coast and gradually descends, and contains Ras Dashan, 15,000 ft., and Abba Yared, 15,000 ft.



E.N.A.

#### THE ZAMBESI GORGE, RHODESIA

The railway bridge, whose central span is 500 ft. long, is the highest bridge in the world

has an average elevation of 10,000 ft., and the highest peaks are over 14,000 ft. high. 2. The W. Coast System consists of the Cameroon Mts., between 13,000 and 11,000 ft. high, and the highlands of Lower Guinea, known as the Kong Mts. 3. The E. Coast System, which is the most important, consists of: (a) The S. section containing the Drakensberg with Mont-aux-Sources, 11,200 ft.; the Randberg with Stritzkop, 7500 ft.; and the Nieuwveld, with Compassberg, 8000 ft. In Cape Prov. is the enormous plateau called the Great Karroo, great plains the total area of which is probably 100,000 sq. m., with a climate as dry and healthy as any in the world. (b) The section between the Zambesi and Abyssinia, containing the highest peaks in A.

**Plains and Deserts.**—There are 2 great deserts, the Sahara, the largest desert in the world, in the N., and the Kalahari, a sandy rainless region in the S. The Libyan and Nubian deserts are really a continuation of the Sahara.

**Rivers and Lakes.**—Considering its size and compared with other continents A. has but few rivs., and her commercial prosperity has been greatly retarded by the want of navigable rivs. with good harbours. Most rivs. are impeded by cataracts. The most important are the Nile, Congo, Zambesi, and Niger. The Nile is of political, historical, and commercial importance, and its overflow is of vital importance to Egypt. The great lakes connected with the Nile are Victoria, Albert, and Edward. The Congo,

which drains an equatorial rainy dist., has a constant water supply, and between Stanley Falls and Stanley Pool the riv. is navigable for 1000 m. Lake Tanganyika supplies the Congo with a considerable amount of water. The Zambesi is the chief riv. in the E., and though navigable in some parts, its course is impeded by cataracts and rapids. The Zambesi or Victoria Falls, the largest in the world, are situated on this riv. The Zambesi is connected with Lake Nyasa by the Shire. The Niger is of great commercial importance, being navigable almost entirely from its source to its mouth in the gulf of Guinea. The Orange R. is neither useful for navigation nor irrigation, but the Limpopo, with its mouth just N. of Delagoa Bay, is navigable for about 60 m. The Senegal, Gambia, and Ogoway flow into the Atlantic on the W., and provide navigable waterways for some distance from their mouths.

*Climate.*—Nearly three-fourths of the total area lies within the tropics, under the vertical rays of the sun, so that there is almost perpetual summer with definite seasons of rain and drought. The variations in the climate are caused by the prevailing winds and height. Ruwenzori and Kenya, almost on the Equator, are covered with perpetual snow for 2000 or 3000 ft. downwards from their summits, and there is also perpetual snow on many peaks in Abyssinia. The sides of the mts. are in many cases very fertile, yielding different vegetation according to the height. The prevailing winds are from the N.E. and the S.E. The N.E. winds, having come across Asia, bring no rain to N. A. The S.E. winds bring moisture to the coast dists., but owing to the mts. it does not reach the interior, hence the Kalahari desert. The region of the tropical rains extends from 18° N. lat. to 20° S. lat., where the vegetation is luxuriant and the soil productive except in the swamps near the coast.

*Productions.*—The vegetation varies in different parts according to the climate and soil. In the regions bordering on the Mediterranean the olive, fig, orange, and vine are found. In the Sahara the date palm grows in the oases; but the vegetation of this dist. is very scanty. In the Lower Nile valley—the fertility of the soil of which depends on the overflow of the Nile—cotton, wheat, flax, rice, and maize are produced. The Sudan is a pastoral and agric. region. Cattle are reared, and durra and maize are cultivated. In the W. dists. bordering on the coasts, and especially in Senegal and Gambia, the palm is found and palm oil is the chief article of export. The W. equatorial regions consist of dense forest with thick undergrowth, and here the chief productions are palm oil, ebony, ivory, rubber, and bananas. The chief product of Abyssinia is coffee. The E. plateau produces millet, and the savannahs provide good pasture land. In the S. sheep, goats, and the ostrich are reared, wool, skins, and feathers being exported; and the vine, maize, sugar, and tobacco are cultivated. The fauna

of A. is remarkable. The Hon. hippopotamus, elephant, rhinoceros, panther, leopard, hyena, buffalo, and giraffe frequent the forests. The crocodile is found in large rivs., and the monkey is found all over the continent. The zebra and antelope are also common, the camel frequents the N. deserts, and the ostrich the S. deserts. Birds, reptiles, and insects abound in great varieties. Of the mineral products the most important are gold, diamonds, copper, coal, and iron. Gold is found in S. Rhodesia, the Transvaal, the Orange Free State, and the Gold Coast; diamonds at Kimberley; copper at Ookiep in Cape Colony; coal in Natal and Cape Prov.; and iron in Algiers.

*Races and Population.*—The pop. is estimated at 150,000,000. Some dists., such as the deserts and swamps, are almost entirely uninhabited. The most thickly populated regions are the Nile delta, the Lower Nile valley, and the basins of the Congo and Niger. The S. and extreme N. are not so thickly populated as these dists. In this continent are found many branches of the human race. 1. European settlers include Dutch, Portuguese, Eng., Fr., Sp., Its., Gers., and Turks, who occupy the extreme N. and the S. 2. Asiatic settlers include Hamites, Semites, and Hindus. The Hamites, from Arabia, early settled in Egypt, Nubia, and Libya, and they have wandered over the Sahara. The Semites also, from S.W. Asia, followed the Hamites and settled in the Mediterranean coast dists., the W. Sahara, and the Sudan. Their descendants are known as Berbers. Hindus are found chiefly in the Transvaal. Tuaregs, a mixture of Berbers and Negroes, dwell in the Asben Mts. in the Sahara, and the Tibbus in the E. of the Sahara. 3. The original natives consist of Negroes, Hottentots, Bantus, Bushmen, and several dwarf tribes. The Negroes dwell mostly in the Senegal and Gambia dists., the Guinea coast, and the Sudan. The Bantus—the most important types of which are the Zulus and Kaffirs—occupy the S. or peninsular part of the continent. The Hottentots dwell in the S.W. coast dists.; the Bushmen in the W. of Cape Prov. and in the Kalahari desert. The inhab. of Madagascar, the Malagasy, are not an African stock, but a branch of the Malay family.

*Religion.*—Mohammedanism is the religion of the Hamites and Semites. Christianity prevails in Upper Egypt and Abyssinia, and has been introduced in many parts by European missionaries. Many of the natives of the S., however, are still nature-worshippers, and believe in evil spirits and fetishism.

*Social Conditions.*—The occupations of the natives are hunting, cattle-rearing, and agriculture. In the N. the Hamites and Semites rear cattle, and the people of the Sudan, the Nile valley, and Abyssinia are mostly agriculturists. In the Sahara and E. Sudan are the Nomads. In the European settlements agriculture, sheep and ostrich farming,



gold, copper, and diamond mining, are the chief occupations. Many people are also engaged on the plantations. Slavery, although being gradually discontinued under European influence, is still prevalent amongst the Arabs of the interior; and cannibalism is still common among some of the native tribes.

**Political Divisions.**—European nations who have settled in A. have gradually extended their dominions, until almost the whole continent has come under the influence of European states. The only states that are independent are Morocco, Abyssinia, and Liberia, but the first-named is a protectorate partly Fr. and partly Sp.; while the last owes its independence to the intervention of the U.S.A. The different divs. and the European states to whom they belong are:

**French.**—Algeria, a large part of the Sahara and the Sudan, Tunis, Fr. Guinea, Senegal, the Ivory Coast, Dahomey, Wadal, Fr. Congo, the Fr. Somaliland Protectorate, Madagascar, with the Comoro Is., and Bourbon or Réunion Is. Area, 3,619,641 sq. m. Pop. 4,000,000.

**British.**—The Union of S. A. (consisting of the provs of Natal, Cape of Good Hope, Orange Free State, and the Transvaal), Swaziland, Basutoland, Bechuanaland Protectorate, N. and S. Rhodesia, Nyasaland Protectorate, Uganda Protectorate, Kenya Colony and Protectorate, Somaliland, the Colony and Protectorate of Nigeria, Gold Coast, Sierra Leone, Gambia, and the Is. of Ascension, St. Helena, Mauritius, Seychelles, Socotra, and a few other small is. and dists. Area, 1,652,000 sq. m. Pop. estimated at about 50 millions.

**Egypt** (area, 383,000 sq. m. Pop. 14,186,756) and the **Egyptian Sudan** (area, 1,008,100 sq. m. Pop. 5,500,000) were, prior to 1922, under Brit. and Egyptian administration. By the Anglo-Egyptian treaty of 1936 Egypt became a Sovereign State, and the military occupation by Brit. forces was terminated. Provision was made in the treaty for a reconsideration of its terms in 1956. Negotiations for revision were begun in 1946. The status of the Sudan as a condominium was reaffirmed in the treaty of 1936. (See further under EGYPT.)

**Portuguese.**—Madeira Is., Cape Verde Is., St. Thomas Is., Prince's Is., Portuguese Guinea, Portuguese W. A., and Portuguese E. A. Area, 791,294 sq. m. Pop. 8,399,101.

**Spanish.**—The Canary Is., the portion of the N.W. coast between Cape Blanco and Morocco, Ceuta, and a few other ports on the N. coast, and Fernando Pó and Annobón in the gulf of Guinea. Area, 83,400 sq. m. Pop. 722,167.

**German** (before the First World War).—Togoland, the Cameroons, Ger. S.W. A. between Portuguese W. A. and the Orange R., and Ger. E. A. Area, 931,659 sq. m. After the war Togoland and the Cameroons were mandated partly to Great Britain and partly to France, while Ger. S.W. A. was mandated to the Union of S. A. From that time Ger-

many's colonial empire in A. ceased to exist. Pop. 12,320,000.

**Italian.**—Tripoli, or Libya. Area, 399,000 sq. m. Pop. 1,000,000. It. Somaliland, 220,000 sq. m. Pop. 1,000,000. Eritrea on the Red Sea Coast. Area, 64,000 sq. m. Pop. 510,000. Abyssinia 350,000 sq. m. Pop. 7,000,000. By the end of 1941, with the surrender of Gondar, Italy had lost her entire E. African Empire to the Brit. forces. Its disposal, apart from Abyssinia, which has regained its independence, remains to be decided by the United Nations Organisation.

**Belgian.**—The Congo is Belgium's only colony. Area, 902,665 sq. m. (including Ruanda-Urundi), 923,590 sq. m. Pop. 15,000,000.

**Changes in Boundaries after the First World War.**—The chief results of the First World War on the map of A. were the complete erasure of Germany from A., and the complete cancellation of all Turkish claims and interests in the continent. This followed from Germany's renunciation, under the treaty of Versailles, of all her rights and titles over her overseas possessions. Under the mandatory system created by the covenant of the League of Nations Ger. S.W. A. is now administered by the Union of S. A. as a fifth prov. of the Union; Ger. E. A. was transferred to Great Britain with the exception of the sultanates of Ruanda and Urundi, which were mandated to Belgium; the Cameroons (*q.v.*) (or Kamerun) and Togoland were divided between Great Britain and France, the greater part of Togoland, with the cap. Lomé, and the railways, and practically the whole of the Cameroons as it stood before 1914 going to France. The Brit. mandated sphere of about 13,000 sq. m. in Togoland is administered by the Gold Coast Gov. The Brit. sphere in the Cameroons is a strip of 33,700 sq. m., which is administered by the Nigerian Gov. When the First World War broke out, Turkey had already lost all her African possessions, apart from retaining a few vested interests in Egypt and Libya. But under the treaty of Sèvres she gave up all rights in or over Egypt, including her claim to tribute, and all rights in Libya; and she also recognised the Fr. protectorate in Morocco and Tunis to the fullest extent. Since this treaty arrangement Egypt has become an independent Sovereign State, the Brit. protectorate having terminated in 1922. (See above.) Thus France and Great Britain dominate the field in A.—though after the It. conquest of Abyssinia, Italy's share had for a few years considerably increased—and the elimination of Germany removed the power which pre-eminently influenced the scramble for A. which before the First World War twice at least gave rise to serious international incidents.

**Recent Exploration.**—By the first decade of the twentieth century practically the whole surface of the continent had been explored except in the sandiest parts of the Sahara and Libyan deserts, the mountainous regions of Tibet, and

the S. of Gallaland. Probably there remain no new or startling fauna, certainly no new tribes to add to the sum total of known African wonders. This, however, as researches in N. Rhodesia and Tunis show, does not preclude the discovery by archaeologists of remains which may enrich the study of anthropology and geology. Indeed, so high an authority as the late Sir Harry Johnston avers that the scientific study of A. past and present is only just commencing.

In the field of pure anthropology the most significant event of the last few years was the finding in 1925 in Taungs, Bechuanaland, of a human skull (*Australopithecus*) with affinities both to that of an ape and of the Neanderthal man. This followed the finding in 1913 of a human skeleton at Oldoway in N. Tanganyika, which resembled that of a Negro-Hamitic skeleton unearthed at Lake Elmenteita in Kenya by L. S. B. Leakey. Much valuable ethnological information, too, has been gathered concerning the numerous and little-known tribes in different parts of the Sahara, e.g. the Bushongo. From their language, weapons, etc., it seems that they are a kindred people with other tribes of the Ubangi-Chad region such as the Azande (E. Torday, *On the Trail of the Bushongo*, 1925). (See ANTHROPOLOGY.)

*Social Anthropology.*—Researches in African social organisation have been steadily pursued in recent years, and the work of social anthropologists has added greatly to our information. Much has been learned of the moral code of the Ngoni of Nyasaland; of the law and authority among Nigerian tribes, of whom our knowledge is still scanty; of problems of culture-contact among numerous Bantu tribes, notably through the researches of B. Malinowski; of the tribal culture of the Lango (see J. H. Driberg, *The Lango: a Nilotic Tribe of Uganda*, 1923); of the customs of the Bemba and Lambas of N. Rhodesia, particularly through the work of C. Doke and Edwin Smith; of the marriage customs of the Sotho group of the Bantu-speaking tribes of S. A.; of the religions of Nigeria, on which C. K. Meek's researches are especially valuable; of the social structure of the Ibo of S. Nigeria and of the Bushmen of the Kalahari; of the strange culture of the Lovedu society (see E. J. Krige and J. D. Krige, *The Realm of a Rain Queen*, 1943); of the socio-religious activities of little-known tribes of the Tumba region of the Middle Congo; of the social custom of polygamy in the Mende country of W. A.; of ancestor worship and the sacrificial practices of the Kikuyu tribes of E. A.; of witchcraft and anti-witchcraft in Nupe-land in Central Nigeria, on which the researches of S. F. Nadel are noteworthy. Belief in witchcraft is still general (*ju-ju* in W. A.—see JU-JU) and sorcerers are credited with being able to change themselves into animals; and though there are special laws and punishments for sorcery, witchcraft is recognised as being too deep-rooted in the African social organisation to justify a policy

aimed at extirpation regardless of the consequences to that organisation (see F. H. Melland, *In Witchbound Africa*, 1923). Again, the horrors of human sacrifice, ritual murder, and live burials were prevalent until very recent times, and may still prevail here and there where the white man has not trod; and lying, stealing, gluttony, and licentious debauchery were at their worst within comparatively recent years; but much has been achieved through the efforts of the missions and the gradual advance of the social services through the aid of the white man's gov. Above all, there has developed in the sphere of social anthropology a general recognition that policies which do not take into account the nature of the native societies to which they are applied are apt to provoke unforeseen and unwelcome reactions. Modern anthropological work or that branch of anthropology which is variously described as social, practical, and functional, in A. attempts to record the behaviour of the African in his reaction to indigenous and imported influences, and it is progressively devoting greater attention to the latter. At its best it indicates how a desirable reform may be brought about in such a way as to harmonise with the custom of the people whom it affects (see Hailey, *An African Survey*, 1938).

*Communications.*—The inland communications were very defective before the First World War. Except in the S. and in Egypt there were but few railways; and according to its size A. has but a small amount of navigable waterway. Inland communication is, therefore, carried on to a great extent by means of caravans. Camels are used in the N. and oxen in the S. as beasts of burden. Caravan routes cross the Sahara, the 2 chief being the E. caravan route from Tripoli to Lake Chad, and the W. caravan route from Taflet in Morocco to Timbuktu. Thus there is regular communication between the ports of the Niger and Lake Chad and the ports on the Mediterranean. With the help of a few railways and roads, there is natural water communication by riv. and by lake from the mouth of the Nile to the mouth of the Zambesi. The R. Niger and its trib., the Benue, are important means of communication between the Sudan, Nigeria, and the gulf of Guinea, being navigable for large riv. steamers. The Congo brings the produce of the Belgians Congo to the Atlantic coast; and the Zambesi is navigable for a considerable part of its course, except where rapids and cataracts occur.

*Railways.*—There has long been a project for a railway from the Cape to Cairo, which is to run as far as possible through Brit. ter. From the N. it has been constructed from Cairo along the Nile valley through Aswan, Dender, Korosko, Wady Halfa, Abu Hamed, Berber, Shendi, to some distance beyond Khartoum. From the S. it has been constructed from Cape Town through Worcester, Beaufort W., Hope Town.

Kimberley, Vryburg, Mafeking, Palapye, Bulawayo, to beyond the Zambesi. Cape Town and Port Elizabeth are connected by rail, and from Port Elizabeth a line runs through Colesberg, Bloemfontein, Kroonstad, Johannesburg, and Pretoria to Pietersburg. Other lines run from E. London to Aliwal N. and Springfontein; from Durban through Pietermaritzburg to Johannesburg; from Lourenço Marques to Pretoria; and from Mombasa to Port Florence on Lake Victoria. Another extension of 1000 m. connects Dukama with Port Franqui on the R. Kasal, trib. of the Lower Congo. Many other railways have been constructed in Brit., Fr., Belgian, and the former German territories.

Railroad construction has proceeded rapidly since the pioneer work of Cecil Rhodes. Of other than Brit. railways the most important completed work prior to the First World War was the German trunk line from Dar-es-Salaam to Lake Tanganyika (800 m.), opened in 1914. Fr. railroads were not increased to any great extent, but in 1915 a line was completed from the Red Sea coast to the heart of Abyssinia. At Lobito Bay in Portuguese W. A. the Benguela railway has its terminus, a useful line giving the Katanga dist. of the Belgian Congo an outlet to the W. The Cape-to-Cairo all-rail route remains incomplete, but the commercial mind has begun to appreciate that the more practical route is across the continent from E. to W. With the completion of the railway from the Upper Congo at Kabalo, to Albertville, on Lake Tanganyika, the first transcontinental combined rail and boat route was an accomplished fact. There is also E. and W. rail communication, though less direct, between Walvis and Delagoa bays, a 20-m. connection linking up the S. African Union and the S.W. African railway systems. In S. A. in 1918 the line from Cape Town via Bulawayo and the Victoria Falls was extended to Bukama on the Lualaba R. (Belgian Congo). In the colonies new Brit. railways are opening up and connecting the interior with the coast, though not for any great distance; there are now lines feeding the coal- and tin-mining dists. of Nigeria, a local line from Tabora, on Lake Tanganyika, which is projected to a terminus on Lake Victoria, and an extension of the Uganda railway has been in process of construction since 1921. Communications in Brit. E. A. are in course of development, the Brit. Gov. having approved in 1925 the proposal to raise loans up to £10,000,000 for the work. The main railway is the Gov.-owned line from Mombasa through Nairobi to Lake Victoria and on to Uganda (841 m.). There are 600 m. of branch lines.

Road construction proceeds apace, especially in the Brit. W. African colonies, Uganda, and the Belgian Congo. Telegraphic communication in the course of the last few decades has been considerably extended, and the impulse given to wireless telegraphy by the First World War naturally had its effect in A., where modern high-power wireless stations were

installed in E. A., S.W. A., W. A., Algiers, etc., before the Second World War.

**Commerce.**—The Portuguese were the first to trade with A., and they had commercial relations with Upper and Lower Guinea; but the Dutch were the first to settle in the S. Here Huguonots came in the seventeenth century, but it was not until the end of the nineteenth century that trading relations began to exist between Europe and the interior, when Brit., Gers., Fr., Sp., and Its. began to settle in A. There is a local traffic between France and Algiers, but otherwise most of the ocean maritime trade of A. is in the hands of the Brit.

**See also AFRICA, SOUTH-WEST; EGYPT; SOUTH AFRICA,** and separate arts. on countries; and **NEGROES** and separate arts. on native races.

**Bibliography.**—Leo Africanus, *History and Description of Africa* (trans. 1600 by Jory), 1896; Mungo Park, *Travels into the Interior Districts of Africa*, 1799; W. J. Burchell, *Travels in the Interior of South Africa*, 1822-24; Sir R. F. Burton, *First Footsteps in Eastern Africa: Harar*, 1856; D. Livingstone, *Missionary Travels and Researches in South Africa*, 1857; *Narrative of an Expedition to the Zambesi and its Tributaries*, 1865; J. Chapman, *Travels in the Interior of South Africa*, 1868; Sir H. H. Johnston, *The Congo, from its Mouth to Bolobo*, 1884; Livingstone and the *Exploration of Central Africa*, 1891; *History of the Colonisation of Africa by Alien Races*, 1905; H. M. Stanley, *In Darkest Africa*, 1890; *Through the Dark Continent*, 1899; J. Scott Keltie, *The Partition of Africa*, 1893; W. B. Worsfold, *South Africa*, 1895; M. H. Kingsley, *Travels in West Africa*, 1897; E. S. Grogan and A. H. Sharp, *From the Cape to Cairo*, 1900; V. R. Markham, *South Africa, Past and Present*, 1900; J. J. E. Reclus, *L'Afrique australe*, 1901; W. Bleloch, *The New South Africa*, 1902; A. Graham, *Roman Africa*, 1902; C. George, *The Rise of British West Africa*, 1904; R. H. Nassau, *Fetichism in West Africa*, 1904; A. St. H. Gibbons, *Africa from South to North through Moresland*, 1904; A. R. Colquhoun, *The Afrikaner Land*, 1906; J. H. Speke, *Journal of the Discovery of the Source of the Nile*, 1906; J. H. Harris, *Dawn in Darkest Africa*, 1912; I. N. Dracopoll, *Through Jubaland to the Lorian Swamp*, 1914; J. Du Plessis, *Thrice through the Dark Continent*, 1917; Sir C. P. Lucas, *The Partition and Colonisation of Africa*, 1922; Lord Lugard, *The Dual Mandate in British Tropical Africa*, 1922; F. Migeod, *Across Equatorial Africa*, 1923; G. McC. Theal, *History of South Africa*, 1925; S. C. Millin, *The South Africans*, 1926; H. Chilvers, *The Seven Wonders of South Africa*, 1932; P. Schebesta, *Among Congo Pygmies*, 1933; Cambridge Hist. of the Brit. Empire (vol. 8), *South Africa, Rhodesia, and the Protectorates*, 1936; M. Perham, *Native Administration in Nigeria*, 1937; W. M. Macmillan, *Africa Emergent*, 1938; Lord Hailey, *An African Survey*, 1938; H. N. Devitt, *The Spell of South Africa*, 1938; D. Westerman, *The African To-day and To-morrow*, 1939;

E. A. Walker, *A History of South Africa, 1940*; H. Kuper, *An African Aristocracy: Rank among the Swazi, 1947*.

Africa, British East, see BRITISH EAST AFRICA.

Africa, German East, First World War, Campaign in. The conquest by the allied forces of this Ger. colony was virtually completed on Nov. 27th, 1917, when the Mahenge Force under Col. Tafel, comprising 3500 officers and other ranks, surrendered to Gen. Van Deventer. The residue of the Ger. forces then took refuge in the adjoining Portuguese ter., but were gradually rounded up in the course of the next few months. In point of area Ger. E. A. is twice the size of Germany, and its conquest by the E. African Field Force under Gen. Smuts and Gen. Van Deventer after a campaign of some 20 months was a triumph of determination and resourcefulness over conditions which offered hardships. The country is one of almost impenetrable bush lands and desert, abounding in pestilential swamps, and crossed by mt. ranges. Never before in the hist. of warfare had operations on a large scale with modern artillery and weapons been conducted within a few degrees of the Equator, and seldom indeed has one consecutive series of operations taken place over so vast an area. From the nature of the terrain the difficulties in maintaining supplies were serious, the absence of roads and water in the greater part of the country making the support and transport of large armies, marching ever further from their bases, an extremely harassing undertaking. In a measure these difficulties were common to both antagonists; but the Ger. forces were not only more familiar with the country and consequently in a position to baffle pursuit for a considerable time, but in their retreat over a distance of not less than 1000 m. were approaching ever nearer to their supply bases and food depots. Finally, the bulk of the Ger. forces were negroes, hardened against diseases incidental to the climate and country, while the Allies, who were for ever groping blindly in the bushland after an indigenous and elusive foe, specially trained to the peculiar conditions of African bush warfare, comprised men from the temperate regions of S. Africa, Indian troops from the hills, and troops from the United Kingdom.

The first stage of the campaign, from Aug. 1914 to Mar. 1916, when Gen. Smuts arrived, was the longest and most arduous of all, for if the privations were not perhaps so severe as in the later stages, yet the allied troops, being very few in numbers, were always in peril. Not only were they set the task of defending a frontier line of some 600 m., but the military situation was one of ever-increasing anxiety, as on every sector the Ger. forces were in occupation of Brit. ter., the opening attack on the enemy from the sea at Tanga having proved a more or less complete failure. The Ger. forces had between them and

Mombasa no force other than a few Arabs under their picturesque chief Wavel (q.v.), while their outpost at Taveta was a direct menace to the Uganda railway, and their garrison at Longido threatened Nairobi, the cap. of Brit. E. A. Had the Gers. shown the same capacity for aggressive action as for defensive the campaign might well have taken an entirely different turn. This stage was characterised throughout by sporadic fighting, chiefly in the Tsayo region and in the neighbourhood of the Longido line and Ngururhan. At the close of these operations Gen. Sir Michael Tighe, who had taken over the supreme command, made preparations for a general offensive, constructing a new railroad from Voi so as to link up Mombasa with the Ger. N. frontier. At the same time he ran a pipe-line from the well-watered hilly districts of Bura to the desert around Maktan. The first battle was fought at Salaita Hill, where the Ger. forces were strongly posted, but the issue was indecisive. In the early part of 1916, when the enemy's forces numbered about 2700 Europeans and 12,000 natives, Gen. Smuts opened the second stage of the campaign with a brilliant attack near Taveta on the one vulnerable point in the enemy's mt. line. This action marked the turn of the tide, for Gen. Van Deventer, the rains having set in, sent patrols as far into the enemy's country as Kondo Irangi. So far, however, the E. ter. had not been touched, and it was necessary to drive Kraut's army from the Pangani valley, so as to advance on the Central railway. This, after many forced marches, was accomplished, but Kraut's force escaped, and it was only after the lapse of 2 months that Deventer was in a position, having reorganised his riv. transport, to advance on the railway. Gen. Smuts meanwhile forcing the passage of the Wami and isolating the chief town of the colony, Dar-es-Salaam. Following on this success, Gen. Smuts overwhelmed the defensive system of the Uluguru Hills, driving the enemy as far S. as the Rufigi R., in the neighbourhood of which they took refuge during the rainy season. The third stage opened with the problem of dislodging the enemy from the valley of the Rufigi, a task which was accomplished by the S. African Infantry, while at the same time troops landed at Kilwa and elsewhere to drive the enemy from the coastal regions. Then followed a long and very disheartening period of campaigning through dearth of food, almost insurmountable transport difficulties, and the ravages of malaria. About this time Lt.-Gen. Sir J. L. Van Deventer became Commander-in-Chief in E. A., and thereafter conducted the campaign to its conclusion. By the end of Aug. 1918 the enemy had been repulsed with considerable loss at Lioma and barely escaped from converging attacks E. of that tn. The Ger. commander, Lettow Vorbeck, after the most stubborn fighting in the whole campaign—in the Lindi and Kilwa dists.

in the latter part of 1917—had retired across the Rovuma into Portuguese E. A. with some few hundred white troops and about 2500 black troops. The Ger. force having made for the Songea area, Gen. Hawthorn was detailed to get troops there ahead of the enemy. The Ger. commander, who was now at New Utengulu, seemed compelled to go towards either Itunda in the N. or Bismarckburg in the W. Contrary to expectation, he changed his plans, despite the vast and impassable swamps of Lake Rukwa, and marched further S., apparently with the object of attacking N.K. Rhodesia, in the hope of obtaining food and supplies. Early in Nov. the enemy attacked Fife (which stands midway, near the frontier, between Lakes Tanganyika and Nyasa) in force, but was beaten off with loss by the N. Rhodesian Police. Hotly pursued from the N. by the 1st/4th King's African Rifles, he retreated towards Kayambi Mission, reaching Kasama on Nov. 8, Ger. E. A. being thus once more clear of the enemy. The next engagement of the campaign was fought near Kavembe, the 1st/4th King's African Rifles having caught up with half the enemy force at that place. After a stiff engagement the enemy was driven from his position, but all further operations stopped shortly afterwards owing to the news of the signing of the armistice. The last engagement was actually fought on Nov. 12 N. of Kasama, the interruption of the telegraph communications preventing Gen. Van Deventer from getting info touch with the Ger. commander before that date. On the morning of Nov. 14 the Brit. terms, based on Clause 17 of the Armistice, were handed to Gen. von Lettow Vorbeck, in accordance with which the latter formally surrendered at Abercorn on Nov. 25. 'In view of the gallant and prolonged resistance,' says Gen. Van Deventer, 'maintained by the Ger. Force in E. A., I allowed Gen. von Lettow Vorbeck and his officers to retain their swords, while the European rank and file were permitted to carry their arms as far as Dar-es-Salaam.' Under Article 119 of the Peace Treaty Germany, having renounced her overseas possessions, lost Ger. E. A., which was thereafter administered by Britain as mandatory. See Francis Brett Young, *Marching on Tanga*, 1918. See TANGANYIKA TERRITORY.

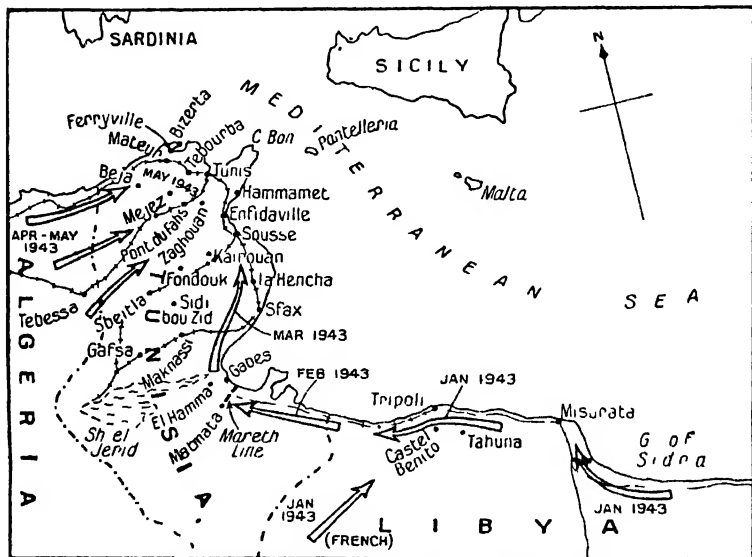
**Africa, North, Second World War, Campaigns in.**

*Battle of the Western Desert* (Dec. 1940–Feb. 1941).—This battle, resulting in the conquest of Cyrenaica by the Brit. Army of the Nile, began on Dec. 9, 1940, and reached the end of its first stage the following Feb. It was one of the most spectacular achievements of all time in the annals of desert warfare, alike in the scientific organisation of the supply services, in its brilliant strategic conception, in the speed and skill of the tactical manoeuvring, and in the remarkable disparity of the casualties sustained by the opposed forces. Five months

previously, when, with France prostrate and her great Syrian army immobilised, Italy had declared war on Britain and her allies, the threat to Egypt from Italy's army of 250,000 men seemed ominous indeed. The dramatic suddenness of Gen. Sir Archibald Wavell's successful onslaught on Sidi Barrani, which opened the Brit. offensive, and the rapidity with which the Brit. Army of the Nile captured one stronghold after another until the whole prov., twice the size of Italy, had fallen into their hands, went far to restore Brit. prestige, besides spelling the doom of Italy in the whole war. Prior to the attack of Dec. 9, the Brit. forces, in spite of their grave difficulties, had not been idle. As early as July, after Marshal Graziani (q.v.), conqueror of Omdurman in the Italo-Abyssinian war, had taken over the Libyan command from the murdered Marshal Balbo (q.v.), there had been patrol encounters at Fort Capuzzo, and air raids on the aerodromes of El Adem and El Gubbi, on shipping in the It. naval base of Tobruk, and on troop concentrations on the Libyan-Egyptian frontier. Graziani crossed the frontier at Sollum, drove back the Brit. forces at Buq Buq, and entered Sidi Barrani on Sept. 21 in pursuance of the plan to strike in the Near E. at the same time that the Gers. struck in the W. In the course of this advance monuments extolling Fascist prowess marked the route into Egypt. Meanwhile Brit. planes had attacked Bomba, El Tmimi, and other aerodromes in E. Libya, while submarines were preventing supplies from reaching the It. forces. The Its. were, however, confident on account of the great strength of their fortified positions in Bardia and Tobruk, having spent 4 years in their preparation; but, as time would show, their offensive was too cautious and unimaginative, assuming almost the character of a defensive operation, while the Brit. defensive always had the latent element of attack which characterises successful guerrilla warfare. At this time Graziani had command of the coastal road for his advance, though it offered one flank to interruption from the sea, and he was separated from the Brit. railhead at Mersa Matruh by only 75 m. But, instead of boldly taking the plunge and advancing, he had halted and wasted time on the preparation of a series of powerful perimeter camps. No doubt, in accordance with the Ger. strategy, the It. main fleet, precluded from engaging in any major action, could not cover Graziani's left flank; but it is to be observed that the dramatic Brit. coup at Taranto (see under NAVAL OPERATIONS IN SECOND WORLD WAR) and the attack W. of Sardinia (*ibid.*) were subsequent to Graziani's stand at Sidi Barrani. In Nov. the R.A.F. had done considerable damage to It. aerodromes at Berka, Benina, Tobruk, and Barca—an essential preliminary to the advance which had been intended by Gen. Sir Archibald Wavell, Commander-in-Chief of the Brit. forces in Egypt. But at this moment Italy suddenly invaded Greece

in the hope of upsetting Britain's sea power in the Mediterranean, and it was incumbent on the Brit. Gov. to send a considerable part of the R.A.F. from Egypt to aid the Gk. army in its heroic resistance. But meantime further reinforcements of Australian and other troops and material had reached Cairo to augment the Army of the Nile, which was under the command of Gen. Sir Maitland Wilson, and indeed, the obvious difficulty of defending Egypt at all after

Maktila garrisoned by the 1st Libyan Div. The assault on Sidi Barrani was unique in its success. Almost at a single leap, across 75 m. of desert from Mersa Matruh, a strong detachment of Brit. and Australian troops advanced on positions which the Its. had fortified 3 months earlier, and entered Sidi Barrani from the quarter least expected by the garrison. At the cost of only 400 casualties the position fell to Gen. Wilson, together with 38,114 prisoners



THE NORTH AFRICAN CAMPAIGN: ALGERIA, TUNISIA, AND LIBYA

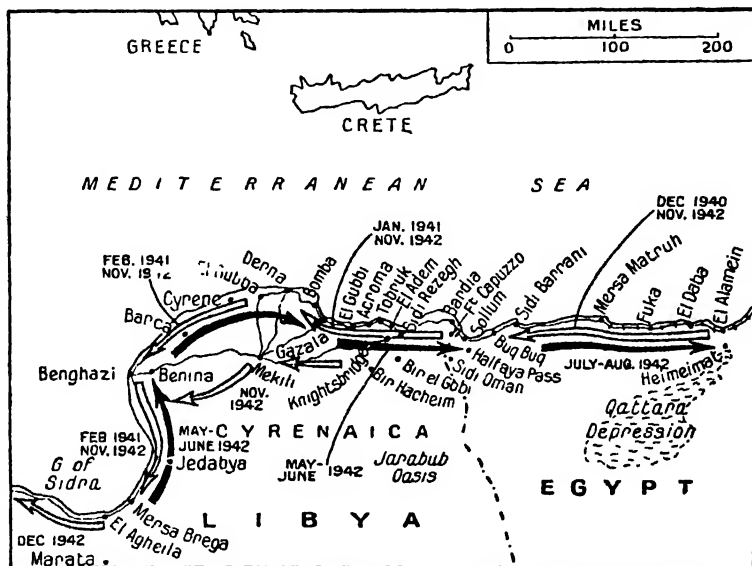
the elimination of France had imposed on the Brit. Gov. the hazardous risk of sending forces—air force personnel, infantry, and guns—to Egypt, which were equally urgently needed in Britain to repel a probable Ger. invasion. The risk, however, was boldly taken and considerable reinforcements in men and munitions were expeditiously and secretly sent out on the long ocean journey.

The now historic Brit. offensive began with an air attack on the It. camp at Nibeiwa—held by an It. mechanised column—15 m. S. of Sidi Barrani, all the It. aerodromes from Derna to Sidi Barrani having been previously so heavily bombed that Italy's total air strength in N. A. was already seriously crippled—Castel Benito, the most powerful It. air depot in Libya, being left a blazing wreck. Simultaneously with the attack on Nibeiwa, the R.N. bombarded the It. positions at Sidi Barrani and

(including 24,841 Its.) and a great many guns, tanks, and stores of all kinds, including choice foods and wines in abundance. A few days later Sollum, Fort Capuzzo, and Sidi Omani were captured and the threat to Egypt had gone. Bardia, Tobruk, Derna, Cyrene, and Benghazi all fell in rapid succession, the Its. never having recovered from the initial shock, and by late Feb. Cyrenaica had been entirely conquered and placed under Gen. Wilson as military governor. Some two-thirds of Graziani's army had been captured or destroyed, and the remainder hurled into headlong flight to Tripoli. Bardia, which fell on Jan. 5, was thought by Graziani to be impregnable, and he had given assurance to that effect to Mussolini. Fortifications on which the Its. had worked for 4 years were as sand castles against the brilliant strategy of Gen. Wavell and the irresistible *élan* of the Brit. mechanised

forces. The position was taken in 4 days, a contributory cause being the overwhelming aerial and naval bombardment which the garrison had to undergo before and during the assault by the Brit. armoured div. The total Brit. casualties in the capture of Bardia were less than 800; the It. casualties were 2041 officers and 42,827 other ranks killed and captured, and, in addition, 368 medium and field guns, 26 heavy anti-aircraft guns, 68 light guns, 13 medium and 117 light

of mechanical transport and the entire absence of water over a vast ter., and, as soon as the fighting troops went forward, advance repair depots had to be estab. in their tracks and pipe lines laid behind, so that a chain of depots, large and small, stretched back behind the firing line, stage after stage, for hundreds of m. Meanwhile, even during the operations at Bardia, the guns of Wilson's Army of the Nile, reinforced by fresh battalions, were shelling Tobruk. Flying columns of



LIBYA AND EGYPT. ALLIED MOVEMENTS, WHITE ARROWS; AXIS, BLACK

tanks, and over 700 transport vehicles were destroyed or captured. Gen. Berganzola, the It. commander at Bardia, escaped only to be taken later S. of Benghazi. The operations at Sidi Barrani and Bardia had reduced Graziani's army by one-third of its effectives, while the capture of Bardia now made it possible to bring up supplies to the Brit. troops by sea, besides considerably extending Gen. Wavell's liberty of action. As a fact, when Gen. Wavell launched his attack of Dec. 9 his striking force was given only 5 days in which to win a decisive success. That was the limit fixed by its supplies of water and fuel and transport. Either it must take Sidi Barrani by Dec. 14 or return to its starting point at Mersa Matruh, having done no more than test the It. defences in a large-scale raid. The need for haste came from the wear and tear imposed by desert conditions on all forms

armoured and mechanical units had cut the coast road to Derna and Benghazi, and were operating still further westwards. The assault on Tobruk, following many days of air bombing, was delivered at dawn on Jan. 21, strongly supported by the Navy, and very soon Australian troops had penetrated outer and inner defences to a depth of 5 m. An It. cruiser, *San Giorgio* (9000 tons) was destroyed in the harbour. The capture was completed by nightfall of Jan. 22 after rapid and brilliantly executed action, similar to that at Bardia, the attack being launched simultaneously at a number of points and assisted materially by the naval and air arms. On the same day Brit. advanced forces had already reached the coast near Derna, 110 m. W. of Tobruk, and Mekhili, an important road junction 50 m. inland; while, as a result of the capture of Tobruk, the It. had to abandon nearly all their chief air bases

in Cyrenaica, besides losing the best natural harbour on that part of the African coast. Derna fell on Jan. 30, after a series of minor actions and affairs of outposts, the fall of the town involving the expulsion of a garrison of 10,000 men. Simultaneously Brit. night bombers made a heavy raid on the docks at Tripoli, tons of explosives being dropped on shipping, seaplanes, mole, and railways. On Feb. 3 Brit. troops occupied Cyrene (W. of Derna), a tn. dating from Rom. times, and previously used by Graziani as his headquarters; Graziani's remaining forces, leaving hundreds of stragglers in Brit. hands, were now pressing in all haste to Benghazi. But 5 days later this tn. also fell, through a skilful manoeuvre involving a twofold assault by Australian troops attacking westwards along the coast and by Brit. armoured units cutting communications from the S. The capture of Benghazi—a tn. of 60,000 inhab., who welcomed the victors with unaffected enthusiasm—and of its excellent harbour was the culmination of one of the most skilfully planned campaigns in military hist. Within 2 months the Army of the Nile had thrown back the Its. from firmly entrenched positions 130 m. inside Egyptian ter. and advanced over 500 m. in country practically devoid of good roads, water, and food, and subject to blinding sandstorms and with steadily lengthening lines of communications. Altogether over 120,000 prisoners were taken, including 19 generals and an admiral and a vast amount of booty—much of which was used in arming the Abyssinians in their revolt against their It. masters. Brit. casualties were less than 2000 in the whole of the operations. It has been generally recognized that the assault on Sidi Barrani was the crucial action of the campaign. The 4 great It. forts or perimeter camps there each measured about 2 m. in circumference, and they were defended by a ditch, a wall, barbed wire, anti-tank guns, and machine guns. The Brit. heavy tanks moved forward under a barrage and passed right round to the rear of the forts. The It. fire was terrific, such as no infantry could have penetrated, but the heavy tanks were not stopped even by hits from shells, while the machine gun bullets were no more to them than rain. Broadly, the heavy tanks were used for assault all through the campaign, the light tanks to carry out reconnaissance and to isolate each successive It. stronghold and, when the bigger tanks and the infantry saw success assured, the light tanks pushed on to the next objective. Following the fall of Derna the light tanks accomplished a remarkable journey of 150 m. in 30 hrs. from Mekili over boulder-strewn country. The column reached its destination, the tarmac road, in the very nick of time to head off the retreating It. Army from Benghazi. The Its. were taken completely by surprise. They had taken no precautions against interception by tanks, simply because they had not believed the journey to be possible. From the direction of

Tripoli the normal motor-coaches were running with civilian passengers. At dawn of the next day the main body of the It. Army appeared, with a strong force of artillery and no fewer than 70 medium tanks. The Brit. cruiser tanks at once attacked. The day saw the hardest fighting of the campaign. All save 8 of the It. tanks were knocked out and, after Brit. infantry had come up in lorries, the whole It. Army surrendered.

*The Struggle for Libya: Defence of Tobruk. Loss of Gunboat 'Ladybird'.*—After the conquest of Cyrenaica by Gen. Wavell the centre of military gravity shifted to the Balkans and (as shown above) Wavell's Army of the Nile was called upon to supply an expeditionary force for Greece. It was assumed that the only Axis threat to Egypt was through the Balkans and Syria, and this assumption derived support from both the premature and abortive revolt in Iraq and the complete annihilation of the greater part of Graziani's legions. But while Tripoli remained in the hands of the Its. the road to Benghazi lay open to Ger. forces, provided these could be landed unobtrusively farther W. and assembled for a determined surprise assault on Benghazi. Ger. armoured formations of first-rate quality were, in fact, landed in N. A. and formed the spearhead of an intended attack on Egypt from the W., to be co-ordinated with indirect attack from the E. through revolt in Iraq. Rashid Ali's *coup d'état* and the Ger. plan to seize Syria utterly failed through the prompt action of the Brit. military commanders, and this in spite of the Ger. success in Greece and Crete. (See IRAQ; SYRIA.) The new direct threat to Egypt from Libya was checked by Wavell's strategy in occupying Tobruk on the communications of the Axis forces and by the resistance offered to the Ger. spearhead round Sollum. The Gers. under Gen. Rommel first made their appearance up the E. coast of the gulf of Sidra late in Mar., and the real strength of their force was cleverly concealed from the Brit. garrison in Cyrenaica until the road to Benghazi had been overrun. The Brit. garrison (much depleted to supply the force for Greece) withdrew and in a few days the Ger. mechanised troops had captured Cyrene, Benghazi, Derna, and Bomba, and were now advancing speedily on Sollum. By the end of Apr. the enemy was standing about 5 m. across the Egyptian frontier, harassed by light forces of the Brit. armoured units. Dust storms and supply problems, however, also played their part in holding up the advance of the enemy, who was still mainly dependent on Tripoli for supplies. Heavy fighting took place at Fort Capuzzo and Halfaya Pass, which latter position was retaken by the Brit. in May, only to fall again to the Gers. a week later. In all, 4 Ger. mechanised columns were engaged, and in spite of the great length and the exposed nature of his lines of communication, the enemy succeeded in bringing up tanks and heavy



motor vehicles. Meanwhile, the Brit. defences of Tobruk had been much strengthened, and the Gers. found the cross fire from the Brit. guns there as heavy a barrage as they had ever experienced.

In operations off the Libyan coast the It.N. lost the monitor *Terror* and the gunboat *Ladybird*, both sank after they had in the previous days inflicted heavy punishment on the enemy. Both vessels were old naval units, the *Terror* having been built in 1916, and the *Ladybird* in 1915. The *Terror* was one of the most curiously camouflaged ships in the R.N., and was often dubbed the Fleet's 'Little Warspite' on account of its heavy armour. Slow-moving and flat-bottomed, she moved (during the battle of the W. Desert) to within sight of the It. shore batteries and then flung hundreds of tons of high explosives into the enemy's positions at Sidi Barrani, Sollum, Tobruk, and Bardia, and was generally credited with paving the way for Wavell's advance in Libya (see *Battle of the Western Desert*). The *Ladybird*, which had made hist. in Panay, China, and later in Libya, went down in a glorious fight to a finish against diving Stukas until the last of her guns slipped beneath the water of Tobruk harbour. Six of nearly 50 Nazi bombers attacking Tobruk shipping and shore defences on May 21 hurled bombs on the boat, but every gun aboard the little 25-ton gunboat met the diving planes with a hail of metal. Bombs burst in her boiler room, exploded heavily aft, and shook her almost out of the water, but the gunners kept to their guns until the order 'Abandon ship.'

In the month May 15-June 15 Brit. attacks on the enemy by air and by ground forces resulted in the destruction of at least 24 Ger. tanks, 140 armoured cars and transport lorries. But the enemy remained in possession of Sollum and Halfaya Pass—the Brit. objectives in an attack delivered by Brit. armoured forces in the second week of June. The retention of Tobruk as an outpost for the protection of Egypt made it possible to hold a line closer to the frontier than was the case when Mersa Matruh was the Brit. base, and when the It. army of invasion occupied Sidi Barrani and its attendant forts. The defence of Tobruk was a veritable epic in Brit. military annals. The siege was, in fact, a deliberate piece of Brit. strategy designed or, at least, invited by Wavell to halt the Ger. movement on Egypt. It changed the face of the campaign by becoming a nodal point of defence obstructing the enemy's lines of communication, and compelling him to maintain a large investing force at Tobruk which could not operate on Egypt. For months the small Eng. and Australian garrison, numbered in hundreds only, defied the armoured power and constant bombing of Rommel's troops. Meanwhile the R.A.F. returned bomb for bomb, and in 2 months (May-June) Benghazi alone was raided over 50 times by Wellington and Blenheim bombers.

Frequent bold sorties by Brit. patrols were the feature of the next few months. Armoured forces, supported by mobile artillery, inflicted casualties on the enemy almost daily. The growing strength of the Army of the Nile rendered these tactics increasingly effective. By early Sept. the Imperial land and air forces standing between the Axis Army and the Suez Canal were far more powerful than they had ever been since the war began. These forces included Brit., Indian, S. African, Australian, and New Zealand troops, many of whom had already been toughened in hard campaigns. With Axis forces blocked on a line stretching roughly due S. from Sollum the desert was now held by an army and an air force greatly outnumbering those which forced their way to Benghazi in the original Libyan campaign of the autumn of 1940.

Throughout this period Brit. submarines, destroyers, and bombers wrought havoc among Axis supply ships and on buildings, wharves, and moles at Tripoli, Benghazi, and other tns. on the N. African coast. It was always evident that each side was now manoeuvring for an attack as soon as climatic conditions permitted. When at length the Brit. did launch their offensive, it was motivated partly by the policy of diverting pressure from the Russian armies defending the Caucasus. And when the offensive was begun Rommel was making his final preparations to reduce the indomitable Tobruk garrison, which had been a thorn in his side for more than 7 months. Rommel's forces, continually reinforced from Italy and Greece, now consisted of 3 armoured divs., the 15th and 21st Panzer and the 132nd Ariete (It.) Divs. and, in addition, a Ger. infantry div. (motorised) and 4 other motorised It. divs. The main Ger. armoured force was S.E. of Tobruk with another panzer div. on the coast, some way to the E. of the tn. The It. Ariete Div. was in reserve at Bir el Gobi, some 80 m. S.E. of Tobruk. The enemy's main infantry force was strung round the Tobruk garrison.

**Second Brit. Offensive (Nov. 1941); Battle of Sidi Rezegh.**—The second Brit. Libyan offensive began on Nov. 17, 1941, when Gen. Auchinleck opened the attack by the newly constituted Eighth Army under Gen. Cunningham, the conqueror of It. E. A. The Brit. plan was to strike right across the desert with their armoured forces by cutting in between the Ger. tanks around Tobruk and the It. tanks at Bir el Gobi and leaving the strong frontier garrisons behind to be attended to first by mobile infantry and then, later, when the main objective should have been attained, to be reduced at will. These frontier positions were exceedingly strong; they had as garrison a whole It. div. plus sev. Ger. battalions—at least 12,000 men in all, with powerful supporting weapons. After 5 months of waiting and preparation Brit. troops for the first time met the Gers. on an equal footing as far as equipment and arms were concerned. The offensive had

been long and elaborately prepared in view of the peculiar conditions prevailing in the W. Desert, in which swift and far-reaching manoeuvres were only feasible through the extraordinary use of armour, air power, and mechanisation—conditions, in some respects, analogous to those of sea warfare. The tanks on the move in the desert, with their high turrets dipping and rising as they cruised on the uneven desert surface with their signal pennons waving in the breeze, looked very like a great fleet of destroyers. The Eighth Army (or Army of the W. Desert) took up its preliminary stations on a broad front from the Jarabub oasis. The attack was launched at nightfall on Nov. 17, and at dawn on the next day the general advance began. Very heavy and exceptional rains hampered the movements of the attacking forces, which had great distances to cover; but these rains, being still heavier in the coastal regions, also hampered the enemy. As was to be expected, there could be no strategic surprise as in Wavell's victory, for each army fully expected an attack by the other at any time. Moreover enemy aeroplanes were active and the movement of troops in the desert even in ordinary times was difficult to hide. Auchinleck struck at the flank—bearing in mind that the coastal sector had been elaborately fortified by the Gers. and its—but far to the S. of the point where Wavell's blow had fallen. In 36 hours Gen. Cunningham's army had advanced 75 m., and very soon its foremost elements had captured the important stronghold of Sidi Rezegh, on the escarpment 10 m. S.E. of the perimeter defences of Tobruk. During the afternoon of Nov. 21 the Ger. panzer forces, hemmed in W. of Fort Capuzzo, made sev. attempts to break out of the Brit. ring, but each time were beaten back with heavy losses on both sides. In 2 major engagements between the armoured forces, the Gers. lost 130 tanks, some threefold the Brit. losses. Brit. armoured columns were now striking at the enemy's communications in many directions over a large area, S. African and other dominion forces pushing northwards behind the Ger. fortified position along the Egyptian frontier. Within the first 5 days New Zealand troops had taken Bardia and Fort Capuzzo, while Indian troops seized Sidi Omar Nuovo. But the hub of operations was the encounter between Brit. and Ger. armoured forces about Sidi Rezegh, S.E. of Tobruk, an area of about 40 sq. m. A rough outline of the battle as a whole as it had shaped between Nov. 18 and Nov. 23 shows that when the order to advance was given, Indian formations, which were stationed at the coastal end of the line, crossed the frontier and got behind the enemy forts there. New Zealanders, a little farther down the line, performed a similar operation, and went round Fort Capuzzo. Armoured divs., which were farther to the S., went straight ahead and then wheeled towards the coast, holding the Ger. armoured divs., which at the time were

operating between Sollum and Tobruk. The tanks met the enemy on the coastal plain round about Sidi Rezegh. The enemy was completely surprised and, from that moment, strenuous efforts were made to prevent him from recovering from this initial blow. The great tank battle of Nov. 21–22 was bloody, but inconclusive. When it was over, however, the enemy withdrew to the N.W., and did not reform until the morning of the 23rd. Brit. anti-tank guns and 25-pounders did heavy execution. The Gers. used thermite shells, which on some occasions succeeded in setting Brit. tanks alight. Throughout Nov. 22–23 action was concentrated round Sidi Rezegh, where the fighting grew hourly more intense and more furious. The Ger. panzer divs. hit back with wild desperation as the Brit. forces drew in upon them, and soon supporting infantry were engaged on both sides. By now there were no definite lines, but merely masses of death-dealing tank+ manoeuvring, attacking, and counter-attacking.

These tank battles were an affair of sudden onslaughts in unexpected places. Sometimes small groups only were involved, and at others whole divs. or brigades were flung into each other's tanks from as close a range as they could manage. For sheer heroism there can have been little in this or any war to surpass that of those Brit. tank crews who, with lighter guns and thinner armour, stood up to and fought off time and again the massive Ger. medium tanks, armed with a gun twice the size of theirs. The attempt to contain the Ger. tanks within the area Sollum–Sidi Omar–Tobruk meant dividing up the Brit. armoured forces, whereas the Gers. could concentrate theirs upon 1 brigade at a time. Rommel's 2 armoured divs. were S.E. of Tobruk and S.W. of Bardia. Seeing the dispositions of the Brit. forces he moved the larger part of the div. near Tobruk to join that near Bardia, and from the morning of the third day of the offensive this formidable combined div. of light and heavy cruiser tanks was attacking and trying to knock out the Brit. tank brigades 1 at a time. The Brit. were not dismayed at the weight of metal against them. Generally, the Brit. tanks could more than hold their own with Ger. tanks of comparable size and gun-power, and fortunately the Ger. tank divs. did not wholly consist of vehicles so formidable as their Mark IV. tank. Heavy bombing attacks on enemy tanks and armoured vehicles in the desert were constantly delivered by the R.A.F., and in the first 6 days of the offensive the R.A.F. destroyed 120 Axis aircraft. A bold diversionary raid made by a Ger. tank column towards the Egyptian frontier through one of the gaps inevitable in the long Brit. 'line' penetrated eastwards, crossed the frontier, and reached a point half-way between Sidi Omar and Halfaya. Then they were met by Brit. aircraft and later by ground forces, which destroyed a third of the enemy tanks. On the following days elements of the

main Brit. forces joined detachments advancing from long-belleguered Tobruk. All through there was the most bitter fighting for Sidi Rezegh, the focal point of the tank battles. The Gers. retook this position, but were thrust out again by New Zealand troops supported by tanks. The Ger. column which had essayed a diversion over the Egyptian frontier was now broken up into smaller groups, which were then hunted down as they fled westward, the diversion having failed to deceive Gen. Cunningham into sending back armoured divs. to deal with it.

**Rommel's Ger. Afrika Korps.**—By the end of Nov. the battle had resolved itself into 3 main areas, but, as at the beginning, the main and by far the most important front was the tank-strewn area round Sidi Rezegh. Ger. armoured forces and motorised infantry penetrated the Brit. positions on Dec. 1, only to be thrown out again after extremely bitter fighting. The It. Ariete Div., after losing half its remaining tanks in a violent action E. of Sidi Rezegh, fled northwards with Brit. forces in hot pursuit. Brit. bomber and fighter aircraft always retained mastery of the air. Up to Dec. 1 they accounted for 176 enemy aircraft, their own losses being less than a third of these. It was found, however, that in the 1600 sq. m. of desert over which fighting raged, the air arm was robbed of a great part of the importance it had attained in a land of roads, railways, and large towns; for tanks in the open proved that they could not then be dominated by the air arm. Only armoured aircraft carrying quick-firing cannon were likely to reassert the authority of air fleets over land fleets. It may here be pointed out that the Gers. had been specially trained as colonial troops. In Mar. (1941) the Ger. counter-offensive in Cyrenaica had been undertaken mainly by the specially trained Ger. Afrika Korps, not an improvised organisation, but the product of large-scale work by certain depts. of the Ger. general staff incorporated in the Nazi party Colonial Office. Two centres were formed in Bavaria and Schleswig-Holstein, in which selected officers and men had to undergo the most extraordinary but, at the same time, most rigid training a soldier has ever received in Germany. Specially constructed hot-houses with tropical temp. were the permanent living quarters of these troops. Exercises for advance and defence were held in large halls, also under tropical temp., and Gen. Rommel, an officer of the inner circle of Hitler's staff, was in charge of this training. The medical staff of the Hamburg Tropical Diseases Institute formed the nucleus of the medical personnel attached to these units. It was troops of these units that had made their dramatic appearance at El Agheila on the Gulf of Sirte in Libya late in Mar. 1941.

**Siege of Tobruk lifted.**—During the intense tank battle at the end of Nov. in the area about Sidi Rezegh and Bir el Hamed, where the Gers. made

a desperate effort to break westwards through the Brit. and New Zealand troops, Gen. von Ravenstein, commanding the 21st Armoured Div., together with 610 other Ger. officers and men, were captured. Meanwhile Brit. mechanised patrols had reached the coast S. of Benghazi; while in the S., at Jalo, another force was preparing to strike N.-westward to the coast. Gen. Rommel now threw all his remaining armoured forces into the fighting round Sidi Rezegh, and succeeded in breaking through the Brit. corridor, and again cutting off Tobruk. At this juncture both sides paused to refuel and reorganise for the next phase of the battle, the Brit. concentrating their main strength on an offensive line from El Gobi, 25 m. S. of Tobruk, towards Sidi Rezegh, 11 m. S.E. of that fortress. Up to this time some 8000 Ger. and It. prisoners had been taken. The battle was soon joined again, and Gen. Rommel was again defeated near El Gobi and the Tobruk supply line was restored. The loss of this area was a blow to Rommel, whose tanks were now being driven W. To the E. of the chief battlefield the greater part of the country between the Tobruk-Bardia road and the El Gobi-Sidi Omar road was now cleared of the enemy, though Bardia itself still remained in Ger. and It. hands. In the central Mediterranean many blows were struck at the enemy's sea-borne supplies, loaded supply ships and tankers carrying petrol and ammunition being frequently torpedoed, bombed, and sunk. The siege of Tobruk was lifted by Dec. 10 and the enemy's westward withdrawal accelerated.

The battle against Rommel's forces had now been in progress for over 3 weeks, but the quick decision hoped for by Gen. Auchinleck had not been obtained. Brit. tank losses had been severe, and the battle had not progressed according to plan, the armoured battle being inconclusive; and, but for strong pressure at Tobruk, the full force of the Ger. motorised infantry would have moved on Bardia to relieve the encircled garrison and thus have jeopardised the whole Brit. offensive.

**Rommel's Forces in Retreat to Sedabya and El Agheila.** Brit. close in on Halfaya.

—The beginning of the third phase came with the storming of El Adem, on the escarpment due S. of Tobruk and 20 m. W. of Sidi Rezegh. Striking along the coast the New Zealanders from Tobruk soon reached Gazala, while other Indian and Brit. troops pushed up from the S.E.; while on the S. flank Brit. columns continued a slow but steady advance, mopping up enemy positions in their progress. Thus both a N. and a S. prong were closing in on Rommel's westward-moving forces, which, however, fought back strongly to avoid encirclement. After 5 days of intense fighting, in which all his remaining forces were flung into the battle, Rommel's front in Libya was broken, and his forces were in retreat.

But though the enemy had been driven out of the positions which barred the Brit. advance westward—with the exception of Bardia, Sollum, and Halfaya

—his forces were as yet far from destruction. In his flight westward Rommel, who had begun the campaign with more divs. than his antagonists, was reinforced with supplies from the sea and air, and was always prepared to take up fresh positions, and stand at bay for a time. The Brit. offensive was handicapped by the growing problem of transport over great distances of desert terrain. The retreating enemy forces were now being pursued towards Mekili and Derna, and the aerodrome at the latter place fell to the Brit. forces on Dec. 18. Both places fell the following day without opposition and, as the enemy retreated W. of Mekili, the R.A.F. delivered heavy attacks on Benghazi, Henina, and the Barce-Derna road and at Jedabya. Cyrene and Apollonia were taken on Dec. 21, and the Brit. forces were now pursuing enemy columns along the road to Jedabya, S. of Benghazi. By the 22nd the Eighth Army, now reinforced, were heavily pressing It. forces covering Benghazi, while Brit. mobile columns reached the coastal plain on the gulf of Sirte, S. of the cap. Along this plain Rommel's Afrika Korps were retreating in some disorder, abandoning large quantities of war material. Benghazi was entered on Christmas Eve by the Royal Dragoons after it had been evacuated by the enemy. The tn. was found to be devastated. The whole harbour front had been battered to crumbling ruins through the incessant R.A.F. attacks on the port. The Hotel Bernice, former base control post of the Luftwaffe, was completely gutted, while 15 hulks of sunken Axis ships were discernible in the harbour. The nearby aerodrome of Barce was captured by the Central India Horse and the Henina aerodrome by a Brit. mobile column comprising units of the Rifle Brigade and the Royal Horse Artillery.

The enemy's main forces under Rommel were now in the Jedabya zone, where they were striving to repulse Brit. columns advancing from the S. On Dec. 29 S. of Jedabya the bulk of Rommel's armoured units counter-attacked, but lost 22 tanks while 20 others were badly damaged, the Brit. losing 14; but a mechanised Hussar regiment captured 5 lorry loads of Ger. infantry.

Bardia was recaptured on Jan. 2 by S. African troops, supported by Brit. tanks, and over 1000 Brit. prisoners of war were thereby released. Before the attack the tn. was subjected to the heaviest barrage of the Libyan campaign, which included a naval bombardment and intense bombing from the air. Nearly 8000 Axis prisoners, including 1000 Gers., were captured, among them being Maj.-Gen. Schmidt, chief administrative staff officer of the Ger. panzer force.

The Brit. forces (under the command of Gen. Ritchie, who had succeeded Sir Alan Cunningham in Dec.) had covered over 400 m. in their advance across the country, which had thus occupied 6 weeks. The heaviest toll had been taken of the enemy, and the war booty captured was enormous. On

Jan. 6 It. infantry of the Trento div. and the remnants of the Ger. Afrika Korps rallied on a line running S. from Jedabya, hotly engaged with Brit. troops of the Brigade of Guards. While Rommel was being barred here, and in his subsequent retreat on El Agholla, Brit. forces had taken Sollum and were closing in on Halfaya. The positions at Halfaya were exceptionally strong. One of them was centred in a deep winding gully which split the face of the escarpment from top to bottom. Both the gully's head, where it came out on top of the escarpment, and the foot, where it debouched seawards, were covered by an elaborate system of strong points and minefields, the average depth being 500 ft., while the precipitous sides were honeycombed in caves and dug-outs capable of hiding thousands of men. The importance of the Halfaya positions to the enemy, and also to the Brit., was that they commanded 2 of the shortest roads from the coastal belt at Sidi Barrani and Sollum on to the escarpment.

Rommel having been pushed out of Jedabya, now made a stand between Aghella and Marada where a series of broad wadis provided a natural obstacle and from that time (mid Jan.) he proceeded to consolidate his positions while awaiting reinforcements.

*Four Months' Lull. Rommel's Counter-attack.*—There now followed a period of some 4 months of uneasy quiescence, during which there were intermittent patrol activities and air raids. But behind these minor exchanges strenuous efforts were being made on both sides to reinforce and re-equip the opposed armies. Rommel's task in this respect being much the easier in view of the far greater distance over which Brit. reinforcements and equipment had to be transported. On Mar. 20-21 Brit. tanks daringly raided the Martuba and Tmimi aerodromes nearly 40 m. beyond the enemy's main position, and returned with 200 prisoners. Thus challenged, Rommel moved up from the Tmimi-Mekili 'line' to a position much closer to the Brit. front. This enabled him to establish defence in depth and to seize every dominating crest and ridge in front of the Brit. positions, thus limiting the area within which the Brit. patrols could operate. The Brit. Command had, meanwhile, lost no time in fortifying their own positions. On May 26 the storm broke. Gen. Rommel launched the Afrika Korps to the attack, his object being to defeat the Brit. armoured forces and to retake Tobruk. Probably the remoter objective was an advance on Suez concurrently with a break-through by the Ger. armies to the Caucasus. The Brit. Command, through air reconnaissance, had foreseen the attack, and the Eighth Army under Gen. Ritchie was fully prepared to meet it. The Brit. air forces opened a counter-offensive on the 21st Ger. Armoured Div. with heavy attacks against enemy forward aerodromes. On the night of May 26-27 the Afrika Korps passed to the S. of Bir Hachem, moving

N. with great rapidity towards Acroma, and also towards the old battlefields of El Duda and Sidi Rezegh, which were actually reached by some of its most forward troops. These were soon driven off by Brit. armoured forces. On the same night the enemy attempted a landing from the sea near Acroma, but was driven off by Brit. naval forces. Long before they approached El Adem, which is near Tobruk, or Acroma, the Axis armoured and motorised troops were brought to action by the 1st and 7th Brit. Armoured Divs., together with Brit. heavy tank brigades.

*The 'Battle of the Cauldron'—Fr. Defence at Bir Hacheim.*—The full brunt of the enemy initial advance to the E. of Bir Hacheim was taken by the 3rd Indian Motor Brigade Group, which was overborne by sheer weight of metal, but not until after it had inflicted heavy losses on the enemy. Meanwhile an attack on Bir Hacheim had been beaten off by the Free Fr. forces, with heavy loss. Rommel's attacks on the N. front of the Brit. main positions S. of Gazala, launched on the 27th, achieved little. Throughout May 28, 29, and 30 there was very heavy and continuous fighting between the Brit. armoured divs. and brigades and the Ger. Afrika Korps backed up by the It. Mobile Corps. The battle swayed backwards and forwards over a wide area, from Acroma, in the N., to Bir Hacheim, 40 m. to the S., and from El Adem to the Brit. minefields, 30 m. to the westward. Finding himself running short of supplies and water Rommel made gaps in the Brit. minefields, one along the general line of the Capuzzo road, and another 10 m. to the S. These 2 gaps lay on either side of the defended area held by a brigade of Brit. infantry, which strenuously resisted the enemy's attempts to pass his transport through their ranks, and on the 28th A.V.M. Cunningham directed his whole air force on to low attack against the enemy armour and motor transport in this region, and a great number of vehicles and tanks were knocked out or disabled. But by night-fall on May 31 Rommel had succeeded in withdrawing many of his tanks and much transport into one or other of the gaps, which he then proceeded to protect from attack from the E. by bringing many of his numerous anti-tank guns into action. The fighting from the start developed into the biggest battle that the W. Desert had theretofore known. On June 6 an enemy column 18 m. long, headed by 60 tanks and containing 2000 motor transport vehicles and lorried infantry and strongly supported by artillery, swept round Bir Hacheim in a S.W. direction, and headed for the Brit. positions in the 'Cauldron,' an area lying between the gaps in the minefields. A series of exceptionally fierce engagements took place. An attack launched by Rommel's main armoured forces against the Brit. positions known as 'Knightsbridge' was stopped by Brit. and Indian infantry and artillery, and the enemy was

driven back westwards. After nearly 2 days of furious fighting the first phase of the 'battle of the Cauldron' ended in a definite Ger. repulse; while in the S. the Fr., now surrounded at Bir Hacheim, held fast against almost continual attacks. This third Libyan campaign was waged by the Brit. Command on different lines from the previous encounters. This time Gen. Auchinleck was content to let his adversary take the offensive in the hope that he might whittle away his armoured strength by a succession of attacks on rock-like defences, and in mighty but fruitless battles with the greatly strengthened Brit. armoured units. In the midst of the utter desolation that is Libya the physical endurance of the tank crews on both sides in the heat and dust of the desert was evidence of the mutual realisation of the seriousness of failure. Even when a heavy thunderstorm blotted out everything for a brief period, the parched and dusty desert was almost dry again within an hour, and the sun, breaking through, revealed the Brit. armoured brigades charging across the Trigh-Capuzzo Ridge. The Gers., following their usual tactics in meeting such counter-attacks, gathered their armour together in one solid phalanx and the thunder of guns and the staccato bark of Brens and rifles rolled over the Libyan plains until darkness fell. The defence of Bir Hacheim was, however, becoming ever more difficult, Rommel increasing his tank forces there and sending reinforcements to help the Its.

*Rommel captures Tobruk.*—From now the course of the battle swung sharply against Gen. Ritchie's army. The crucial moment for the Brit. was when the enemy, having forced a gap in their minefields, was having difficulties with supplies owing to the intense air attack. For at this juncture the enemy was exhausted; but unfortunately the Brit. army, being equally exhausted, was unable to exploit its adversary's condition. Gen. Ritchie's counter-attack on June 4 on Rommel's forward base in the Brit. minefield area was premature, and the Brit. forces were compelled to fall back before a fierce counterstroke and suffered considerable losses. Rommel was therefore able to concentrate his attention on Bir Hacheim. Gen. Ritchie tried to lift the pressure on this position by using mobile troops and intense air support, but on June 10 he decided that the risk of maintaining this isolated garrison was too great, and it was withdrawn. With the fall of Bir Hacheim the investing enemy forces were released for co-operation with the forces preparing to attack in the Knightsbridge-El Adem area and 3 days later the Brit. had to abandon some positions there, which opened the way for Rommel to break through to the coast and try to cut off the 1st S. African and 50th divs. in their position S. of Gazala. Gen. Ritchie, however, was very largely successful in withdrawing these divs., which joined the Eighth Army to the E. of Tobruk. But Rommel continued

to press his attack in the El Adem area and estab. himself E. of the El Adem defended local area at Sidi Rezegh. After 4 days of the fiercest fighting Ritchie on June 17 withdrew his army to the El Adem-El Duda-Sidi Rezegh area, and concentrated his main forces towards the frontier, leaving what he erroneously considered to be an adequate garrison in Tobruk. Rommel, having advanced rapidly eastward merely to ascertain the Brit. strength between the Egyptian frontier and Tobruk, now wheeled sharply round westward and on June 20 attacked Tobruk from the S.E., and quickly penetrated the perimeter and positions E. of the Tobruk-El Adem road. The attack on the Brit. garrison at Tobruk then began in earnest with panzer thrusts of considerable ferocity and dive-bombing Stukas following a particularly heavy artillery barrage. Soon the Gers. were shelling the harbour. Scratch units formed of engineers, men of the Ordnance Corps and Army Service Corps, together with S. Africans, fought with desperate bravery against the most hopeless odds both in men and material. Heavy and medium tanks, guns, and the large number of 88-mm. anti-tank guns, which the enemy rushed up into the gaps made in the perimeter defences, put down a terrific barrage, and hurled the defenders back. The small Brit. tanks inside Tobruk now came out to join battle, being outnumbered in a furious bloody struggle, and, though many Ger. tanks were knocked out, the enemy's numbers and fire-power inevitably won the day. Two enemy columns flooded in through the gaps, and moved at reckless speed towards Tobruk tn. The Brit. and S. African forces retired inside the tn. and put up a gallant fight, meeting enemy attacks with artillery, machine-gun, and small-arms fire all day, hurling back attempt after attempt of the Gers. and its. to enter the tn. Then dusk fell. The defenders spread a tornado of fire all round the approaches to the tn., but under cover of darkness the enemy crept up, entered the streets, and began to force the defenders out of the houses with grenades, Tommy-guns, and machine guns. House-to-house fighting ensued, and there were savage encounters in the streets. The end was now not long in coming, and soon afterwards the garrison surrendered, 28,000 prisoners being taken by the enemy, together with much material.

*Explanation of the Brit. Defeat. Superiority of the Ger. Tanks and Anti-tank Guns.*

—Thus for the third time in 2 years a Brit. force suffered a reverse in Libya, and each time the reverse followed what had appeared to be substantial victory, the enemy in the first 2 battles being driven back to the borders of Tripolitania. In all the battles the fighting took place at great distances from bases, and not only was the vast battlefield barren, waterless, and uninhabited, but it contained only 3 natural defensive positions, and these were coastal tns.; any other position had to be constructed and fortified with materials brought from

a base. The only way to win a desert success on such a terrain was to assemble a force strong enough to defeat the enemy's armour so thoroughly that there was none left to get away. But in this, as in the 2 previous battles, the Brit. armoured force was inadequate for this task. The Brit. initial success was partly due to their unremitting air attacks on Rommel's motor transport. With the armoured forces nearly equal in mere numbers as was the case in this third battle, the decisive factor was hitting power. Apart from a blunder in tactics, the main reason for the Brit. reverse was the fact that they were outgunned. The new General Grant (Amer.) tanks carried excellent 75 mm. guns, but the bulk of the Brit. force consisted of tanks armed with a 2-pounder gun, which was useless against Ger. tanks equipped with at least a 47-mm. gun. The Ger. Mark IV. used either 75-mm. guns or converted 88-mm. anti-aircraft guns in vehicles with specially hardened armour; the Mark III. had 75-mm. or 50-mm. guns, and even the It. tanks with 50-mm. and 47-mm. guns outmanoeuvred and outgunned everything on the Brit. side except the Amer. General Grants. It was due to his contempt for the Brit. tanks that Rommel made his confident sweep northwards in the opening days of the battle and, though the Grants were a surprise, they were not in sufficient numbers to prove decisive. The fact that victory so long seemed within the Brit. grasp was due to an improved recovery of damaged tanks, and to the commanders' skill and courage in individual encounters. Again, Rommel had the advantage in anti-tank guns, and showed much cleverness in their use; while the bulk of the Brit. anti-tank guns were only 2-pounders, the new and excellent 6-pounders being very few in number.

But the Brit. reverse was not to be assigned even primarily to the undoubted if temporary inferiority of their mechanised arms: for Gen. Ritchie still held Rommel's forces, and could still hope to win, until July 13, on which disastrous day the main Brit. armoured force ran into an ambush, and of the 300 tanks with which the Brit. commander started the day only 70 (excluding light tanks) remained by nightfall. In those few hours the battle was lost, and lost on the spot, thus illustrating the truth that, in these mechanised desert battles, one false move or one brilliant tactical stroke might turn the course of a campaign.

*Rommel's Advance on the Nile checked.*

—The fall of the fortresses compelled Gen. Auchinleck to fall back before a victorious and better-armed foe to Mersa Matruh. Flushed with success Rommel now gathered his forces for an advance on the Nile delta (July 3), but his advance now received a very definite check at El Alamein. Gen. Auchinleck's Eighth Army, having repelled Rommel's new general attack, delivered a counter-attack with tanks and motorised infantry and forced the enemy to withdraw westward. Having regrouped and replenished his

tanks Rommel returned to renew the assault, but in a different direction, this time swinging his armoured forces N.E., while his coastal columns attacked from the W. in the expectation of smashing the Brit. infantry in the Alamein 'box.' But the Brit. commander immediately turned his forces N. and went in against Rommel's flank and rear. The fighting that ensued was fierce but short-lived and, before dusk, the Axis forces withdrew from the ridge to the S. of the Brit. positions, whence they had hoped to out-flank the defence. Time was, however, essential to Gen. Auchinleck, for it was becoming a battle of attrition, and the issue might well lie with the side to which reinforcements came quickly. Every day of successful resistance and counter-attack served to reduce the peril to Egypt. Moreover, the allied air forces, whose co-operation with the land and naval forces was growing daily closer, were now increasing their attacks to a scale unprecedented in the Middle E. A vital change had already come over the desert battle. The Axis momentum had spent itself. Hitherto Rommel's tired men, with the lure of Cairo and Alexandria, had forgotten their fatigue, the scantiness of their rations, and their long bout of costly fighting. This glorious prospect gradually faded as their terrific effort brought them no nearer their goal (Aug. 20).

*Mr. Churchill visits Egypt. Appointment of Gen. Alexander and Montgomery.*—Before the fall of Tobruk most of the 6-pounder guns which were to be used in the coming battle had been dispatched, together with the more heavily armed and more heavily gunned Brit. tanks; while, in addition, President Roosevelt sent over a number of Sherman tanks and a large number of self-propelled 105-mm. guns for contending with the Ger. 88-mm. high-velocity guns, all of which were destined to play a recognisable part in the forthcoming battle of Egypt. Unfortunately the Brit. set-back of the summer had delayed the advance on the road to Tripoli, a move which had been prepared in conjunction with the projected Anglo-Amer. landings in Morocco and Algeria. It was now essential therefore to bring the Brit. Eighth Army into a condition to regain the initiative and to resume the offensive, this being an integral part of the Allies' whole N. African strategy. Meanwhile the Brit. units in Egypt needed intensive training in the use of the new weapons when they reached that country. By rearming the men on a gigantic scale, the disasters of the summer were eventually repaired and the defence of Egypt converted into a successful attack. It was of good augury that Gen. Auchinleck had succeeded in stemming the Axis advance, but Mr. Churchill, having visited Egypt, decided to make changes in the higher command, and Gen. Alexander, the defender of Burma, replaced Gen. Auchinleck, who was later transferred to India, while Lt.-Gen. Montgomery was appointed to command the Eighth Army. On Aug.

10 Mr. Churchill gave Gen. Alexander the instruction to take or destroy at the earliest opportunity the Ger.-It. army commanded by F. M. Rommel, together with its supplies and establishments. Intensive preparations were made behind the Brit. lines in face of an imminent attack by the Axis army, whose leader felt confident in his ability to take Cairo in his next leap, and so drive the Brit. E. of Suez. Rommel delivered his attack on the Eighth Army, which was now reinforced by the 44th Div., on the night of Aug. 30-31. Pivoting on the Ita. in the coastal area he came round the Brit. open S. flank, which had been left free of the Qattara Depression in order to allow liberty of movement in the event of a turning operation, with the whole Ger. Afrika Korps, including the 90th Light Div., 2 Panzer divs., and a large part of the 20th It. Motorised Corps. It was assumed that the Ger. commander would not venture to by-pass the Brit. Eighth Army and push on to Cairo, and in this surmise Gen. Alexander was right; but, in order that the Eighth Army should have the fullest freedom of movement, a new army was brought into being along the line of the Nile and Delta for the protection of Cairo.

*Renewal of the Struggle at El Alamein. Rommel driven back.*—Rommel now found himself confronted with stiffer resistance and with artillery used on the largest scale and abundantly supplied with ammunition. After 3 days he withdrew with heavy losses, the Brit. casualties being 2000, the Axis losing a disproportionate number of tanks. Rommel could ill afford losses, for he had been much hampered by the sinking of his supply ships by Brit. submarines and by Brit. and Amer. air attacks from Malta and Egypt. The heaviest fighting took place between Heimeimat, near the Qattara Depression, and the Ruweisat Ridge in the left centre of the Brit. line. Rommel hoped that the Brit. commander would send his armoured forces out against him, but the Brit. commander was not tempted into ambushes, and the Axis tanks then pushed up cautiously towards the N., where they were met at 1100-yds. range with a tremendous gun-fire and sheered off. The Gers. lost more than 40 tanks on Sept. 3, and their armoured divs., under ceaseless pressure from 25-pounders, 6-pounders, and heavier guns, which had been swiftly moved up to new positions, and from innumerable sorties by the Brit. and Amer. air forces, compelled Rommel to fall back slightly—an event of good augury for the Brit. commander in view of the weight of the attack. The Brit. commander of the Eighth Army wrested the initiative from Rommel by this date (Sept. 2), and 4 days later Rommel had been driven back to his starting point. Wherever he had probed the Brit. lines for a weak spot he was hurled back with losses. During the whole attack, especially on Sept. 2-3, the Axis made air attacks on the biggest scale, sev. raids being carried out by as many as 100 aircraft, but each time they met with severe reverses.

*The Brit. Victory of El Alamein (Oct. 23-Nov. 7, 1942).*—By late Oct. Gen. Alexander was ready to pass to the offensive. There followed one of the most glorious victories of Brit. arms. It was realised by the Brit. Command that the enemy was converting the position in front of the Brit. line into a fortress, blasting gun-pits and trenches in the solid rock, laying enormous and elaborate minefields. An attack round Rommel's S. flank would have led into difficult terrain, and was therefore impracticable. Yet, on the other hand, a frontal attack was a most formidable operation. It was, however, decided to attack frontally by putting up a terrific artillery and air barrage under cover of which the infantry would advance and clear the minefields to the subsequent advance of the armoured units, and these tactics were completely successful. On a 6-m. front of attack the Brit. had a 25-pounder gun or heavy weapon every 23 yds.; it was necessary to effect penetration of about 6000 yds. at the first stroke in order to get through the minefields, trenches, and batteries of the enemy, and this was successfully achieved, the Brit.- and Amer.-manned air squadrons contributing signally to the successful operation. This aerial ascendancy was used with the most devastating effectiveness: threatening counter-attacks were broken up before they could develop; far in his rear the enemy's supplies were ceaselessly bombed; his mechanised transport was blasted and his roads of retreat jammed with smashed vehicles. Heavy blows, too, were constantly struck at Rommel's supplies by the Navy. The Brit. naval and air forces sank 50,000 tons of Axis shipping over these few days, an operation which was assisted by the great defence put up by the R.A.F. and anti-aircraft guns against the Ger. air attacks on Malta in Sept.-Oct., during which period hundreds of Axis planes were shot down. On Oct. 29 there was a big-scale encounter between opposing tanks, the Axis forces being driven off with considerable losses, Brit. gains being held while their tank losses were slight. From the moment that the seaward flank of the enemy was broken and the great mass of the Brit. armour had flowed forward and successfully engaged the panzer divs., the fate of the Axis troops to the southward, amounting to 6 It. divs., largely motorised, was sealed. As the Brit. advance reached El Daba, and later, Fuka, the enemy's lines of supply and retreat were equally severed. They were left in a waterless desert to perish or surrender. At Fuka a grim action was fought on a smaller scale, but with equal spirit on both sides, between the Brit. armour and the remnants of the Ger. panzer army, the Gers. being almost entirely destroyed, only a few elements escaping to Mersa Matruh, where again no halting-place was found. Tactically the position had grown serious for Rommel on Nov. 1, when a corridor W. of Tel-el-Eisa was enlarged, and a lane cleared for armoured formations which were at last able to advance on to open

ground. Thereupon United Kingdom and Indian troops advanced rapidly and soon widened the already formidable gap in Rommel's lines. A few Axis tanks succeeded in crawling into a pocket at a position called Thompson's Point (Oct. 31); but they never got out again. On the night of Nov. 3 Rommel's army, depleted and battered, but still formidable, stood firm on strong positions from Sidi Abd-el-Rahman right to the Qattara Depression; but by the night of Nov. 7 that proud army had become a scattered rabble, fleeing blindly towards the illusion of safety which its former bases in the W. held out. All over the sandy and desolate region men were moving westwards, some in cars and lorries, others on foot, seeking hopelessly to escape remorseless fate in the shape of Gen. Montgomery's triumphant Eighth Army and the R.A.F., which was pursuing them and hunting them down. The Axis retreat, which had begun methodically on Nov. 3, first N. of the Qattara Depression, had by Nov. 7 become a rout, in which the Gers. abandoned their It. allies in the desert after depriving them of their transport in the hope of making good their own escape to Benghazi or elsewhere. By this date over 40,000 Axis prisoners had been taken. The Axis casualties steadily mounted, for the fleeing enemy, crowding the narrow coast road, presented amazing targets for the R.A.F.

*Halfaya Pass and Tobruk recaptured. Cyrenaica overrun.*—When this remarkable battle opened the Afrika Korps front line army was composed of some 100,000 mixed Gers. and Itas., with nearly 700 tanks, of which possibly two-thirds were It., and a very strong army of artillery and anti-tank guns. Well over half these tanks were totally destroyed or knocked out or captured, and the remainder were picked up in deserted workshops in the rear areas—16 being found at Daba. The majority of the guns (over 1000) were either destroyed or captured. The amount of booty in Brit. hands was reminiscent of the first Libyan campaign, when the W. Desert was strewn with Graziani's materials of war. Gen. von Stumme, who had commanded the Axis forces during Rommel's brief absence in Berlin, was killed. Gen. Ritter von Thoma, commander of the Afrika Korps, and numerous other senior Ger. and It. officers, were taken prisoner. By mid Nov. the number of Axis losses in men was more than 70,000. The Brit. casualties were 13,600. The race for the Libyan ports had now begun. Halfaya Pass fell a few days later, and Tobruk was once again in Brit. hands by Nov. 13.

Within a few days Sollum and Bardia were again in Brit. hands and, within 4 weeks from that time, the Eighth Army had overrun the whole of Cyrenaica. While Brit. engineers were effecting repairs to the Benghazi (g.e.) docks to render the port practicable as a supply base, Gen. Montgomery's forces pressed hard on the heels of the Ger. Afrika Korps. In the last week of Nov. Rommel reached the powerful natural position of El



Aghella, where, having received reinforcements, he hoped to concentrate his reorganised forces for resistance. But on Nov. 13 the Brit. Eighth Army completely outmanoeuvred him and turned his forces out of their strong positions at Mersa Brega just E. of El Aghella, at little cost to themselves. Rommel's forces then renewed their retreat westwards, relentlessly pursued by the Brit. forces. Allied

peditions, and suffered no losses, except for 2 small ships in Oran harbour. The landing forces, which were under the command of Lt.-Gen. Dwight Eisenhower, commander of all Amer. troops in the European theatre of operations, was led by U.S. Rangers in separate parties at strategic points, followed by armoured infantry and small numbers of marines and bluejackets. Parachute



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EL ALAMEIN TO EL AGHEILA : 750 MILES IN THREE WEEKS  
Crusader and Sherman tanks pass through Mersa Matruh.

fighter-bombers, operating on an unprecedented scale, were employed to harass the enemy in his retreat, Axis air activity being entirely ineffective in preventing these operations.

*Anglo-Amer. Landing in Fr. N. A.*—U.S.A. and Brit. forces landed in Fr. N. A. early on the morning of Nov. 8, 1942. The city of Algiers at once surrendered, and thus paved the way for the occupation of the surrounding area. There were landings at sev. points, and a number of important air-fields were seized by the allied air forces. The only serious resistance was from navy and coast defence artillery, the mass of the Fr. armed forces having no wish to oppose the entry of Amer. troops. Brit. naval forces of great strength covered the ex-

troops seized vital airports and communications. Aircraft from carriers and heavy units of the Amer. and Brit. navies covered the landings. The landing parties swept inshore off the beaches near Algiers and Oran, capturing 3 air-fields. Resistance from coastal batteries was dealt with by allied naval forces under the supreme command of Adm. Sir Andrew Cunningham (q.v.). The capture of the naval base of Oran virtually ended all Fr. resistance in the Mediterranean. Amer. bombers and heavy warships bombarded the harbour of Casablanca, where the 35,000-ton battleship *Jean Bart* was left ablaze. The immediate objective of the allied forces was Tunis and President Roosevelt now requested the bey of Tunis to allow Amer. forces to

through Tunisia. Gen. Giraud, who had escaped from a Ger. prisoner-of-war camp and, later, from Vichy France, arrived in Algeria to assume the leadership of the Fr. movement and to organise the Fr. N. African army to fight beside the forces of the Allies. In a broadcast to the commanders of the Fr. fleet at Toulon Adm. Darlan (q.v.) asked them to bring the fleet over to N. A. It is difficult to say what would have been Darlan's course of action inasmuch as he still purported to act only in the name of Pétain; but his assassination soon afterwards left Giraud as the sole leader. This great N. African enterprise was planned in Apr. and July 1942, when Gen. Marshall, head of the Amer. Army and Air Force, visited London, with Adm. King, Commander-in-Chief of the U.S. Navy. It was decided to hold the Gers. on the Fr. shore and to strike at their S. flank in the Mediterranean through N. A. As a very important part of this N. African operation, it was necessary to bring the Brit. Eighth Army into a condition to resume the offensive in Egypt. How that task was achieved is shown above in the account of the battle of Egypt. Detailed negotiations with anti-Axis elements in N. A. were conducted by Gen. Clark, deputy-commander to Gen. Eisenhower, together with 3 Brit. and some Amer. officers, who all met in a lonely house on the coast. The expedition, and indeed all the participants in this preliminary conference, narrowly escaped capture by the Vichy police.

*The Tunisian Campaign Opens. Eighth Army's Pursuit of Marshal Rommel. Fall of Tripoli.*—In the early days of the Tunisian campaign Brit. infantry and artillery, on Nov. 17, reached the important pass at Djebel Abid in the N., and, in their first rush after landing at Algiers, it seemed as if the Allies might capture Tunis without difficulty. Parachutists seized the aerodromes of Souk-el-Arba and Tebessa, and, with Fr. co-operation, Gona was occupied. Then Mejez el Bab was taken and, on Nov. 26, the Brit. entered Tebourba. But thereafter the Gers., having landed heavy reinforcements and supplies from Sicily, stiffened their resistance and it soon became evident that the struggle for Tunisia would be arduous. Moreover, the Axis possessed most of the practicable air-fields, while the terrain offered great obstacles to the allied advance—obstacles which were aggravated by roads and tracks deep in mud under a continuing and protracted rainfall. A general advance of all the allied forces in Tunis in co-operation with the famous Eighth Army under Gen. Montgomery, now depended on the speed with which that army could advance into Tunisia. Advanced elements of the army cut Rommel's retreating columns in two at Wadi Matratin (50 m. W. of El Aghella) on Dec. 17, but the Gers. succeeded in breaking out of the flanking trap after losing 700 prisoners. None knew yet where Rommel's army would end its long retreat, and make a stand, but the general

belief at this time was that it might be at Misurata (110 m. E. of Tripoli). The vanguard of the Eighth Army, aided by the astonishing speed with which the R.A.F. had moved up, reached Taurga (120 m. E. of Tripoli) on Jan. 18, and the position of Misurata was obviously useless to Rommel. With the possession of advanced air-fields in Tripolitania the siege of Malta was virtually ended, and towards the close of Jan. the island's aircraft were co-operating in the Brit. offensive in Tripolitania. On the road to Tripoli the Ger. rearguards fought stiff delaying actions, notably near Tarhuna and Castel Benito, at which latter place was a large air-field. The capture of Tarhuna meant that the Eighth Army had reached the end of the desert and was assured of its water supplies. The Brit. flag was hoisted in Tripoli on Jan. 23, 1943—a symbolic act which in effect marked the end of Mussolini's colonial empire—but the Eighth Army passed rapidly on, Montgomery's aim being to come to grips with Rommel's army. Rommel left all along the road of his retreat—the longest known in military hist.—strong rearguards and minefields to hold up the Brit. advance. There was now no doubt that his real destination and place of battle was to be the Mareth line, 200 m. W. of Tripoli. This line was a strong series of connected defences, on the pattern of the Maginot line, which some years previously had been constructed by Fr. engineers, no doubt with the intention of holding Tunisia against any possible attack by the Its. It started on the coast in the gulf of Gabes, and extended through Mareth to Matmata (a length of 20 m.). On the W. end are deep wadis, and a chaos of hills offering strong vantage points for defence.

*Rommel attacks at Sejenane and joins Forces with von Arnim. Rommel takes the Kasserine Pass. Allies regain the Initiative.*—The purpose of the Allies was to end Ger. occupation of N. A. as speedily as possible, particularly as the Gers. were still able to land reinforcements and guns and tanks at Bizerta. To accomplish this purpose the Brit. First Army under Gen. Anderson must advance in the N. of Tunisia through Mateur to Tunis, and attack the forces of Gen. von Arnim. Further S. the Amers. had Gafsa and Maknassi as their immediate objectives. Fr. forces were to co-operate, and the whole conception of the allied thrusts was to deprive the Axis forces of their control of the 'corridor' extending between the sea and mts. from Gabes to Tunis, and to drive them into the sea. With Montgomery's arrival on the S. border of Tunisia in mid Feb. the other allied armies now had some opportunity of driving against the flanks of the road up which Rommel's Afrika Korps must, if engaged and defeated at the Mareth line, withdraw. But the Axis forces took the initiative, on Feb. 14, when they began a twofold thrust towards the W. and N.W.—through the Fald Pass against Sidi Bou Zid, 70 m. W. of Stax, and in the direction of Sbetta, 60 m. W.

of Sidi Bou Zid. The first of these thrusts was strengthened by part of the forces of Rommel, whose position in the narrowing country between the allied line from Sejenane in the N. to the Shott Jerid in the S. and the sea was one which called for desperate manoeuvres, if only to delay the ultimate allied victory while the Nazi Gov. strengthened the fortifications of the It. and Fr. Mediterranean coasts. Early in Mar. the Axis forces made repeated attacks in the Sejenane area and gained ground though at heavy cost. All attacks in other areas had been successfully repulsed. But it was now clear that Rommel's long retreat had been skilfully executed, though hurried by the whole way by the Eighth Army and the R.A.F. In Tunisia he succeeded in joining hands with von Arnim and completing the occupation of a broad belt of ter. stretching from Tunis to the S. frontier, and he was now trying to seize the initiative by striking at first one foe and then another, while his adversaries, who, apart from the Eighth Army, had but small forces, had to withdraw into the mountains to regroup, having failed to pin Rommel against the coast. Following up his success Rommel captured the Kasserine Pass, 20 m. W. of Sbeitla, and then attacked at the Pass of Sliba, which was held by Brit. units of the Brigade of Guards. But as the campaign developed it became evident that these were temporary and comparatively slight reverses, representing, as it were, the rushes of a bull maddened by attackers in a restricted arena and seeking in all directions for some way of breaking through. The idea of Mar. were ill-omened for the Ger. command. Rommel's detached forces N. of the Mareth line were hurled back through the Kasserine Pass and retreated on Gafsa. The plan to cut through Gen. Anderson's lines in N. Tunisia, and turn his positions from the sea to Jebel Mansour, was foiled with heavy losses, but the Gers. persisted in their attacks. On Mar. 6 Rommel's infantry and tanks delivered 2 heavy attacks against the Eighth Army in the Mareth area, but the Gers. suffered severe casualties, those of the Eighth Army being negligible. In other parts of Tunisia Axis offensive efforts were now being relaxed, and the Allies had, after a long set-back, at last regained the initiative.

**Battle of the Mareth Line.**—On Mar. 20 Gen. Montgomery, having completed his preparations, attacked the Mareth line by a frontal and 2 flank attacks. The frontal attack began with hundreds of guns pouring tons of explosives on a sector less than a m. wide. Simultaneously with this, the main attack on the centre of the Mareth line, Brit. forces pierced the Axis coastal flank, and carried out another diversionary flank movement on El Hamma, 20 m. behind the Mareth line. There was desperate fighting for the Ger. stronghold by the Wadi Zigzaou. Crossing the Ger. minefields under intense fire Brit. troops spread into the wadi, crossed the ravine under cross fire, and clambered

up the bank of the wadi with scaling ladders. But, although they established a bridgehead for a time in the Mareth line and took 3000 prisoners, they soon afterwards lost the bridgehead to a strong counter-attack by the pick of Rommel's troops. It was clear that the effort to maintain a bridgehead through the narrow, viscid wadi bottom must involve heavy losses, especially to Brit. sappers whose arduous struggle to make a causeway of brushwood in the mud to carry tanks was thwarted by searching enemy fire even at night. When on Mar. 23 Gen. Montgomery saw that a continuance of the frontal assault was likely to prove too costly, he transferred the main weight of his attack round the Matmata Hills, throwing in infantry and tank forces to support the outflanking units which had already been engaging the enemy behind the Mareth line S.E. of El Hamma. The New Zealand Div. under Gen. Freyberg (q.v.) and the 51st (Highland) Div. played a great part in this outflanking movement from the W. which hurled the enemy into precipitate retreat. While this change of plan was being carried out, the Mareth forces continued to fight a holding battle, creating as best they could the illusion that the battle for the bridgehead would be renewed. The capture of a dominant hill (known as Hill 184), which denied to the enemy any distant view of the broad amphitheatre between the Jebel Melab, 15-20 m. S. of El Hamma, and the Jebel Tebaga running to the N.E. in which it was intended to draw up the Brit. forces, was effected after the decision to switch the main attack from the centre, and was a vital part of the plan. A hot, choking *khamisin* wind enveloped in their own dust the Brit. line of vehicles which had been coming up with the reinforcements from Medenine to Fom Tatahouine in a continuous line 30 m. long. The plan was to surprise the enemy by violation of the usual rule of attack by night and give him no time to make fresh dispositions. Thus the *khamisin* now proved useful, for it blew dust into the enemy's face, and provided a low screen over the Brit. troops hidden in the folds and in deep wadis lying in the gap near the ancient 2-ft.-high Rom. wall constructed 1700 years previously against hostile attack from the S. and W. The R.A.F. started the attack on El Hamma at 2 p.m. on Mar. 26, and 2 hrs. later the barrage of medium guns, howitzers, and 25-pounders opened. The guns were concealed behind every convenient natural feature in the vast amphitheatre over which the whole force would advance and were so trapped on the enemy that every 30 yds. of his line had the entire fire of 1 gun. At the same time the expansion of the knolled plain became alive with the erstwhile hidden tanks and infantry, and soon the whole mechanised mass was roaring and lurching over the bumpy ground in 6 columns towards the Rom. wall. The Gers. and its watching from the other side gazed with horror, as shells fell thick round them and bombs

crashed in destruction behind, while the wind blinded with its acrid dust the mighty array of allied power rolling inexorably against them. Down among the advancing columns they could see the Brit. infantry jolting through the track previously opened in the minefield. By next day the Gers. were caught between the hills to the E. and the allied forces, with no escape except towards the Mareth line, which by now was crumbling, or northward through Gabes. By the 28th the Eighth Army was in possession of the whole of the strongly organised defences of the Mareth line, the Axis forces withdrawing at great cost of tanks, guns, motor transport, and men (8000 prisoners), and was retreating through Gabes, which was then being bombarded by Brit. warships.

*Brit. Victory of Akarit. Eighth Army contacts Amer. Forces from Gafsa. Sfax, Kairouan, and Sousse taken. Rommel's Forces escape northward. The Allied Attack on Tunis and Bizerta.*—The Axis defeat at El Mareth was soon followed by another defeat at the hands of the victorious Eighth Army, at Akarit, a very strong position N. of Gabes. In pitch darkness on the morning of Apr. 6 some 500 Brit. guns opened up on the position. Under cover of the barrage Brit. and Indian infantry, including men of the Northumbrian Div., which had fought with the utmost gallantry in the frontal assault on the Mareth line, overwhelmed the surprised Axis forces, seized all key points, and estab. a bridgehead. A hole having thus been blasted in the centre of Rommel's defences, the Brit. tanks streamed through, chasing the retreating foe towards the N., and, by nightfall of the same day, the open country had been reached, and over 6000 prisoners taken. At the same time the Eighth Army made contact with the 2nd U.S. Corps from Gafsa. Four days later Montgomery's forces seized Sfax (90 m. N. of Mareth) and continuing a relentless pursuit were soon beyond La Hencha on the way to the port of Sousse. In the central sector allied forces from the W. were converging on the holy city of Kairouan, which lies some 30 m. S.W. of Sousse. The air offensive was playing an even greater part in the operations than ever before. Cagliari had been heavily bombed some time previously, a 10,000-ton cruiser, *Trieste*, was sunk in La Maddalena, Sardinia, numerous cargo boats were sunk in their attempts to bring oil and other supplies to the Axis forces in Tunis, and scores of large Savoya and Junkers transport planes were shot down or destroyed on their air-fields in Pantellaria or in Sicily. Kairouan and Sousse were taken by Apr. 12, and the Eighth Army continued its advance through more difficult country in the face of demolition and mines. The first junction between Anderson's First Army and the Eighth Army occurred on Apr. 11 some 20 m. from Fondouk, S. of Kairouan, so that the Axis had now lost the greater part of Tunis, and were being hemmed in within the N.E. corner between Enfidaville and Pont du Fahs southward and Bizerta in the N. Some 20,000 Axis prisoners had been taken by the Eighth Army since Mar. 20. Most of these were It., Rommel taking all available transport for Ger. troops for their retreat northward. Though the Ger. armour suffered severely in an engagement between Kairouan and Fondouk on Apr. 10 the bulk of Rommel's troops escaped northward to join von Arnim. On Apr. 14 the Eighth Army's advance guard reached Ger. prepared positions on the ridge between Enfidaville (on the coast) and the Jebel Bou Hajar, a ridge running across the coast plain from the main mountain spine. Meanwhile Fr. forces had taken part of Jebel Mansour, a position dominating the valley of the Oued el Keb and the Pont du Fahs region, the last-named place being on the railway to Tunis; while the Brit. troops of the First Army in the N. were driving von Arnim's forces back along the Beja-Mateur road, so that the Allies had regained by now most of the positions they had previously occupied in the first rush through Tunis only to lose them to von Arnim in Feb. By Apr. 15 the total number of prisoners had risen to 30,000.

*Axis Forces driven into the Perimeter of Tunis and Bizerta.*—From the Nov. day when the Allies landed in Algeria and the First Army (which was then no more than a div. strong) began its advance into Tunisia, it was manifest that the keypoint where the fate of N. A. would be decided was the old Arab port of Bizerta, steadily converted into a first-class naval base since Franco imposed her protectorate on the bey of Tunis under the treaty of Bardo. To the de Gaulist Frenchmen it was a matter of the bitterest irony that their country's efficiency in the past should be a boon to the enemy in 1943. Most important of all to the Axis forces were the arsenal near Ferryville, S. of Bizerta, in which all kinds of munitions were stored in miles of underground galleries, and the military oil-port where sov. large tankers could berth together, and which was connected by pipe-line with storage tanks holding 200,000 tons of fuel under 60 ft. of rock. But as against this it was true that Adm. Darlan (g.r.) had called a halt to the development of Bizerta because he thought that It. aircraft based on Pantellaria could easily put it out of action. But in spite of Bizerta's strength as a naval base the allied armies were gradually winning the means to sap its strength, having taken the air-fields from which to prepare devastating air assaults; while their air forces were able to attack the lines which linked Bizerta with the continent of Europe. Bizerta, for all its underground arsenal and reservoirs, depended for replenishment on the It. merchant navy, and the continual pounding of the Axis supply service had already taken a tremendous toll. Since sho had entered the war Italy had up to this time lost in merchant shipping sunk or captured well over 4,000,000 tons. On Apr. 19, in one of the biggest aerial engagements

fought in the African campaigns, an Axis air convoy was almost entirely destroyed by Amer. Warhawks and Brit. Spitfires. No fewer than 74 Ger. aircraft, including 58 huge Ju-52 transports out of 100 or more, were hurled to destruction on the beaches or in the sea, together with many of their escort machines. By the closing days of Apr. the Amer., Fr., and Brit. forces were in contact with each other in an arc from the N. coast, through Mejez el Bab and Goubellat, to Enfidaville, and were fiercely attacking the enemy strongholds. The Axis forces were now penned up into almost the immediate perimeter of Tunis and Bizerta, from which they could not escape by land, whilst evacuation by sea or air was hazardous in the extreme. There now ensued a period of the most bitter and bloody fighting, often hand to hand with knives and bayonet, for every yard of the narrowing ground, every dominating ridge or hill in a terrain rugged with complex positions of great natural strength.

*Gen. Anderson's Resistance in Tunis. Strategy of the Final Plan of Attack.*—The whole Tunisian campaign was now, however, to undergo a rapid and most dramatic change; for before the end of the first fortnight of May the whole Axis army had been destroyed, and the First and Eighth Armies, assisted by the 2nd Corps and Fr. colonial troops, had won one of the greatest victories in the hist. of the Brit. Army. This swift transformation was the more remarkable in view of the situation only 6 months earlier. The Allies had invaded Tunisia the previous Nov. with only the weakest forces, the Brit. First 'Army' numbering barely one div. The actual forces which then invaded Tunisia were 2 infantry brigades of the 78th Div., 2 commandos, 2 battalions of parachute troops, and a composite force consisting of 1 regiment of Brit. tanks, 1 battalion of Amer. tanks, 1 motorised company of the Rifle Brigade, a battery of the Royal Horse Artillery, and some armoured cars of the Derbyshire Yeomanry, together with some divisional artillery and ancillary services. These troops succeeded in rushing forward to the occupation of the important pass of Jebel Abiod and, had the Fr. resident-general in Tunis stood firm against the Ger. demands, the Allies would have been in Tunis by Christmas (1942). But he gave the Gers. facilities for bringing in men and supplies, and very soon large Axis reinforcements were pouring into Tunisia. For a short time the Brit. forces, notably the W. Kents and Lancashire Fusiliers, clung to Mejez, drove the enemy back along the Mateur road, held Tebourba, and even attacked Jedida. This last-named attack was a most heroic battle in which the Hampshires greatly distinguished themselves (Nov. 29). Eventually the Brit. forces were obliged to reorganise their line with Beja as the base and Mejez as a salient. But they succeeded in holding the enemy until they were gradually reinforced by

Amer. and Fr. troops, and by the 46th (Infantry) Div. and the 6th (Armoured) Div. At one time, however, the Gers. might even then have driven the still scanty Brit. and Amer. forces back almost to the gates of Algiers. The credit for preventing this and for holding the lines on the edge of Tunisia from which the Ger. attack started, belonged to the Fr. forces, which contained the enemy until the allied armies were in sufficient strength. The Eighth Army's advance from Tripoli at first increased the First Army's burdens, for Gen. Anderson found himself confronted by formidable enemy forces which hoped to defeat him before Gen. Montgomery could arrive. Hence the Axis during Mar. (1943) launched a series of attacks on the First Army which at times Gen. Anderson had great difficulty in resisting, the enemy advancing, as we have seen, almost to Jebel Abiod and Beja, while Mejez was left at the apex of a very dangerous salient. The first task was to oust the enemy from these positions before delivering an attack, and on Mar. 28 the First Army, strengthened by 2 more infantry divs., set to work. The Beja-Mateur road was cleared by the 4th Div. almost to Sidi Nsir, while the 78th Div. attacked the Oued Zarga Hills on Apr. 7 and, by a series of brilliant operations, cleared them almost to Mejez. Meanwhile, the 6th Armoured Div. and infantry of the 46th Div. broke through at Pichon and Fondouk, joined hands with the Eighth Army, and pursued the enemy northwards to the Enfidaville line. Thus was the stage set for the general assault which began on Apr. 22 with an attack by armour in the Bon Arada sector, and, on the next day, the attack became general—the Eighth Army attacking along the Enfidaville line, the First on the Mejez sectors, and the 2nd U.S. Corps and some Fr. units in the hills on the First Army's left flank.

*Gen. Alexander opens the Final Offensive at Mejez and Enfidaville.*—In planning his culminating attack Gen. Alexander, commanding the whole 18th Army Group, realised that the enemy had grouped all his 3 armoured divs. astride the Mejez-Tunis road to meet the Brit. blow, and the one element of surprise he could hope to invoke lay in an unexpected concentration of force at the point of impact. Surmising that von Arnim, the Axis commander, would assume that the Eighth Army would be used to strike the final blow, Gen. Alexander opened the offensive with a feint attack on the Enfidaville line, discreetly withdrawing in the meantime 3 divs.—the 7th Armoured, which had fought all the way from El Alamein, the 1st Armoured, and the famous 4th Indian Div.—which were now transferred to the centre of the First Army front at Mejez. It was thus left to the rest of the Eighth Army to carry on the task of containing the 1st Panzer Army in the Zaghouan massif behind Enfidaville. Though von Arnim had strengthened his front before Mejez, his main dispositions were made to meet

the thrust from Montgomery in the S., and when the blow came from the W. he was unprepared and utterly overwhelmed. In a manner of speaking, the whole battle may be said to have been won before victory was visible; for the Axis steel ring from Bizerta to Enfidaville had been worn dangerously thin by the methodical progress of the infantrymen and gunners of the Brit. First Army through the difficult and tenaciously held mts. and ridges commanding the Mejez-Tunis road. The armoured stroke which was delivered on May 6, and split the Fifth Ger. Panzer Army in two, was essentially an exploitation of mastery already achieved.

*Fall of Bizerta and Tunis.* A breach was opened by the Brit. First Army's infantry in a night attack, and the armoured spearhead, its path blasted in advance by brilliantly organised air co-operation under A.M. Tedder, moved forward so rapidly that von Arnim's plan of defence—to hold Bizerta as an isolated enclave, and to wheel most of his Fifth and First Armies back, pivoting on Zaghuan, to the Cape Bon Peninsula for a final stand—was completely shattered. Half the Ger. Fifth Army was pushed N.-westwards from Tunis into a pocket the W. side of which was closed by the vigorous advance of the 2nd U.S. Corps—which had some time previously been transferred from Gafsa to the N. to co-operate with a Fr. force—from Mateur, which important rail junction was seized by the Amer. corps on May 3 together with hundreds of Ger. prisoners, to Bizerta and the mouth of the Medjerda R. In this pocket nearly 50,000 Ger. troops and 6 generals, including the general commanding the Fifth Army, capitulated *en masse*. Both Bizerta and Tunis fell later in the day of May 7, the Amers. entering Bizerta and the Brit. Tunis. The Amers. reached Ferryville on the S. shore of Lake Bizerta at midday and, swinging eastwards, entered the outskirts of Bizerta soon afterwards. The Brit. First Army smashed Axis resistance E. of Le Bardo, a suburb 3 m. from Tunis, in a street battle, after having advanced rapidly along the main Mejez el Bab-Tunis road during the night. By 8.30 a.m. they were only 8 m. from Tunis, by noon were at the race track 4 m. from the centre of the city, and by 4.20 they were in complete occupation.

*Von Arnim's Withdrawal to Cape Bon Peninsula foiled.* Von Arnim captured, together with a Quarter of a Million Prisoners. —It was the next stage, however, which justified still more strikingly the tactics of Gen. Alexander in transferring part of the Eighth Army to increase the weight and impetus of the First Army's breakthrough. If von Arnim's planned withdrawal to Cape Bon was to be frustrated and his forces, instead of effectuating a 'Dunkirk evacuation,' were to be decisively disintegrated, it was essential, on reaching Tunis, to have sufficient strength to fan out in 2 directions—one part of the spearhead to complete the encirclement of the enemy at the Medjerda R.,

the other to pursue the Fifth Army retreating eastwards from the cap. and, by forcing a way down the Hammam Lif-Hammamet valley, to cut off from Cape Bon the strong Ger. First Army which was held between Zaghuan and Enfidaville by the remainder of the Brit. Eighth Army and by the Fr., who were now in possession of Pont du Fuis. This object was achieved. The Brit. armoured forces reached Hammamet and thereby disorganised all Axis resistance on their way. Cape Bon, with a large additional haul of prisoners, was quickly seized. The Ger. First Army was surrounded and on May 12 the last resistance collapsed. Von Arnim and his staff were taken prisoner, but Rommel had long escaped to Germany. The R.A.F. and Navy prevented any Ger. repetition of the miracle of Dunkirk. In all over 50,000 of the enemy were killed and nearly a quarter of a million prisoners (more than half being Gers.) were taken. Only 638 escaped—mainly by air. The Brit. losses (killed, missing, and wounded) since the general offensive began were 35,000 in all (Eighth Army, 11,500; First Army, 23,500). Thus was won a mainly Brit. victory which afforded a truly classic example of military art, crowning the double campaign which had been begun 6 months previously by forces nearly 3000 m. apart. The Ger. defeat was not inglorious. With the greatest skill the Gers., defeated at Alamain, and threatened in rear, gathered their forces to hold a bridgehead, while Rommel undertook a retreat which was masterly in its timing of moves, economy of forces, and organisation of transport. But the allied plans were too well laid for the Axis commanders, and the heavy reinforcements they had sent across the Sicilian Narrows were but doomed to be mostly captured or destroyed. For only in the turn of the tide the Luftwaffe had been chased from the skies, and the R.A.F., together with Adm. Cunningham's ships, dominated the seas. Closely on the heels of this great victory the allied air forces bombarded the It. fortress of Pantellaria, Cagliari, Naples, and all the Axis bases in Sardinia and Sicily, maintaining their offensive day after day without intermission.

See H. Rowan-Robinson, *Wavell in the Middle East*, 1912; H. M. Stationery Office, *The Battle of Egypt*, 1943; A. Moorehead, *The End in Africa*, 1943; P. Guedalla, *Middle East*, 1910-42, 1941; H.M. Stationery Office, *The Eighth Army*, 1944; Viscount Montgomery, *El Alamain to the River Sangro*, 1948.

*Africa, South-west.* Bounded on N. by Portuguese W. A., W. by Atlantic Ocean, S. and E. by the Union of S. A. and Bechuanaland Protectorate. It lies between S. lat. 17° 25' and the Orange R., with a narrow strip between 17° 30' and 18° 20' S. lat. extending from 21° to 25° E. long., known as the Caprivi Zipfel, and giving access to the Zambezi. The boundaries are the Okavango and Kunene Rts., in the N., and the Orange R., in the S. The total area is about

317,700 sq. m. (excluding Caprivi Zipfel, which is under the Bechuanaland Protectorate), and Walvis Bay (375 sq. m.). Pop. according to the 1936 census is 359,500, of whom 31,000 are Europeans (in 1938 there were 9000 Ger.-speaking Europeans). The native pop. in the ter. proper is 110,100 and that beyond the police zone is estimated to be 216,500, of whom over 165,000 are estimated to be in Ovamboland. The prin. native race is the Ovambo (a Bantu race), and others are the Hereros and Hottentots. The Hereros are a pastoral race, but their tribal organisation was ruthlessly shattered by the Gers. in the Herero war. Under the S. African mandatory rule reserves have been assigned for their occupation.

*Physical features.*—The coastal areas of the W. are barren, especially between the Orange and Ugab rvs. and towards the E. boundary, where a part of the Great Kalahari Desert is included in S.W. A. There are good grazing dists. in the E. but the country, as a whole, is poorly watered, only the Orange and Kunene rvs. having a perennial flow. For the rest the country depends on wells and the subterranean streams of the 'karst' region.

*Administration.*—The administration is exercised by the governor-general, who has, however, delegated most of his powers to an administrator appointed by the Union Gov. The ter. is divided into some 18 dists., each under a magistrate. The ter. of Walvis Bay, which is an integral part of the Cape Prov. of the Union, is administered as a portion of S.W. A. The constitution granted under the Union Act of 1925 provides for a Legislative Assembly of 12 elected members and 6 nominated members, an Executive Council of 4 members elected by the assembly under the administrator as chairman.

*Commerce, Communications, etc.*—Stock-raising is the chief industry, but there is some agric. activity in the less barren regions of the N. Diamonds form the staple product, and the stones, if small, are of good quality. Copper, tin, and marble are also worked. The ann. value of the exports (chiefly diamonds and copper) between 1936 and 1941 ranged from £3,000,000 to £5,000,000. The total length of the railway from the Cape, within S.W. A., is about 1300 m., much of the extension having been carried out during the campaign of 1915. There is also a line of 100 m. linking up the diamond fields near Luderitz. The cap. of S.W. A. is Windhoek. Other tns. are Koetmanshoop, Aroub, Bethame, Grootfontein, and Swakopmund.

*First World War Campaign.*—In the beginning of the First World War campaign the Gers. seized Walvis Bay. Their forces, late in the campaign, were estimated at 5000 regulars and reservists, a high proportion of the white pop. of 13,000 being composed of well-trained reservists. Their total force was not large enough for operations in a colony of 320,000 sq. m. with a native pop. of

90,000, many of whom were still smarting under the memory of the Herero war. Large stores of guns, aeroplanes, and other military equipment had been accumulated in the hope of fitting out an accession of rebels from the S. African Union. The Union forces under Botha and Smuts numbered at least 50,000, equally divided into Brit. and Dutch, the mounted soldiers being chiefly Dutch. The hot desert waste which extends far inland opposes difficulties to an invading force, but the Union leaders were not only skilled in the type of warfare required, but boldly undertook long surprise desert marches and wide enveloping movements, while the Gers. kept to their railways. The first objective was the wireless stations. In Sept. 1914 a Cape Town force seized Luderitz Bay, and soon afterwards another force also landed in the bay, but was held up in case it should be required to deal with De Wet's rebellion elsewhere. A third force landed at Port Nolloth and crossed the Orange R. into the S. extremity of the Ger. protectorate, but owing to the betrayal of Maritz, who soon afterwards joined the rebels, was severely defeated. When the rebellion assumed serious proportions, Gen. Botha took the field in person and in 4 months had suppressed the rebels, whose last stand was made on the Ger. border (Feb. 1915). Meanwhile a new invading force had reoccupied Walvis Bay and taken the port of Swakopmund (Jan.), which Botha thereafter used as his base, while Smuts led the forces operating to the S., which was soon swept clear of the enemy by detachments moving inland from Luderitz Bay. By Apr., after a stiff fight at Gibeon, the enemy had been driven entirely out of the S. part and Gen. Botha issued a proclamation formally taking possession of it. It now remained to take Windhoek, the cap., where the Gers. had a powerful wireless station. But for those operations Gen. Botha wanted increased rail communication from the Union. By June 1915 the railway had been extended nearly 200 m. beyond its previous limit, Prieska, and within a fortnight of its completion the campaign was over, Botha, moving inland from Swakopmund, seizing Windhoek in May. The enemy retreated along their own line to the N.E., hotly pursued by the mounted troops, who accomplished a wonderful desert journey, outflanked them, and forced them to surrender (July). The campaign was a vindication of high military skill applied to special local conditions and a triumph of endurance by the troops. Under the treaty of Versailles the colony was ceded by Germany—who had annexed the country in 1881—to the Union of S. A., which administers the ter. under mandate as an integral part of the Union of S. A.

In the course of the Nazi regime in Germany efforts were soon made to induce the Ger. settlers in S.W. A. to agitate for the retrocession of the country to Germany. In Oct. 1933 Gen.

Smuts and 2 representatives of the Ger. Gov. (de Haas and Ruppel) reached an agreement in London under which the Ger. Gov. stated that it would not use its influence over the Ger. nationals to become Union nationals and, later, by a general agreed Act of the Union Parliament, all except about 200 became Union nationals and Brit. subjects. These moves were calculated to render nugatory the efforts of the Deutsche Bund, representing the naturalised Gers. In S.W. A., to manufacture grievances—such as that the educational system was biased against the Gers. and that Ger. ought to be an additional official language to Eng. and Afrikaans. But agitation by no means died down, and in July 1934 the police took action and raided Nazi headquarters, seizing a very large amount of compromising correspondence. The Nazi leaders were expelled and their party proscribed, but the position remained but little changed. By 1938-39 the whole atmosphere of the country was clouded with political anxiety owing to the obvious efforts of the Nazi Gov. to make the most of every Ger. community in every part of the world as a cell or nucleus for promoting Ger. influence. In S.W. A. there were in 1938-39 approximately 20,000 Union nationals as against 10,000 Ger., but they were not politically organised. Hence, to counteract the pressure exerted by the Nazis on the loyalist elements, they formed the S.W. African League, the objects of which were to knit the Union elements more strongly together and generally to strengthen resistance to Nazi influences by enlightening them on Union and Imperial policy. The retention of S.W. A. must remain a cardinal feature in the Union's external policy; for the Union can never permit the intrusion of a powerful and aggressive neighbour, nor do they desire the forces of anti-Semitism in the Union to be strengthened; and, moreover, they always look forward to a day in the near future when the Union shall be the paramount power in Africa S. of the equator.

**Africander**, or **Afrikaner**, a person living in S. Africa descended from European parents settled there. The A.-Bond, or the Bond party, was founded (1879) in Cape Colony by Hofmeyr, Du Toit, and others, and had as its object the furtherance of A. or Dutch influence in S. Africa. From its object and personnel it followed naturally that it warmly sympathised with the Boer republics in their war with England (1899-1902). After that war it changed its name to the S. African Party. In the first parliament of the S. African Union this party, under the name of Het Volk (The People), secured a majority, and its leader, Gen. Botha, became Prime Minister, and the chief A. leader against Gens. Botha and Smuts was Hertzog, whose attitude in the First World War was equivocal. The suppression of the rebellion which took place during the First World War destroyed Afrikanerism as a force designed to secure an independent S. Africa.

**Afridis**, a numerous tribe belonging to the Pathan or Pukhtun div. of clans and occupying the mountainous region of Afghanistan on the N.W. frontier of India. They are not Afghans, but are the next dominant race to the Afghans proper, and were among the tribes over whom the Afghan Gov. for long exercised no control. Occupying the hilly fastnesses on the Indian-Brit. frontier, or, more particularly, the difficult country S. of the Khyber Pass and W. of Peshawar, and being warlike and fanatic, their hostility to extension of the Brit. *raj* or influence was for years a constant menace to the Brit. authorities. They are estimated to number some 250,000, and, in the past 50 years, were able to muster a war strength of about 25,000. The most serious revolt against Brit. authority in the past half-century was in 1897-98, following the general tribal insurrection in the Swat valley; and the troublesome Tirah campaign was fought before the A. were overcome. The N.W. Frontier irregular troops have often been recruited from the A., Mohmands, and other frontier tribes, but such recruits, being of a treacherous character, are an uncertain factor.

**After-birth**, see PLACENTA.

**Afterglow**, the phenomenon of a broad arch of light, either whitish or rosy, which sometimes appears above the highest clouds after sunset, and is due to fine particles of dust which affect the white light. This phenomenon was widely observed in the red sunsets occasioned by the eruption in Krakatoa in 1883.

**After-image**, in psychology, the persistence of a sensation after the stimulus has been withdrawn. It may be positive, when the sensation continues throughout of the same quality though not of the same intensity; or negative, when a complementary quality presents itself upon the withdrawal of the stimulus. The latter type is chiefly associated with the sense of sight; after looking at a patch of colour and shutting the eyes or fixing them elsewhere, a patch of the same apparent size and form, but of complementary colour, appears. Thus red gives a green A., yellow a blue one, and vice versa. It is suggested that the second image is due to the exhaustion of the sensory powers connected with the first colour and a kind of sympathetic excitation of the elements concerned with the second colour during the process of repair.

**Aftermath** is the grass which grows after the hay has been made. It is sometimes called latter-math, rowen, or rowett; and when left long on the ground it is known in some parts as fog. It provides food for cows and sheep, but is bad for horses. The word is now used metaphorically for any sequence or consequent event.

**Afzelius**, **Adam** (1750-1837), a Swedish botanist, became demonstrator in botany at Upsala 1785, and prof. of medicine 1812. He explored Guinea 1792, was secretary of the Swedish legation in London 1794, and wrote sev. works on natural hist.



**Afzelius, Arvid August** (1785-1871), a Swedish writer and historian. He was the author of *Den Sista Falkengen*, a drama, and a hist. of Sweden up to the death of Charles XII.; ed. popular Swedish songs; and trans. into modern Swedish the Elder Edda and the *Herwara Saga*.

**Aga**, a word signifying lord, said to be of Tartar origin. The Turks use it for chiefs of the janissaries, and commanders of artillery, cavalry, and infantry. It is also used as a title of distinction.

**Agades**, a tn. in the Niger Colony, Fr. W. Africa, and centre of nearly all the most important caravan routes. It is the cap. of Asben, S. of the Sabara, and is situated on the edge of a plateau.

**Agadir**, a Moroccan tn. It was once an important seaport owing to its situation at the mouth of the Sus, being the most southerly maritime tn. in Morocco. The revolution of 1773, and the subsequent rise of Mogador, lessened its importance. In Aug. 1911 the A. incident, as it was known, nearly precipitated a European war on a large scale. The incident arose as follows: The treaty of Algeciras (q.v.), concluded in 1906, to which all the great powers, including Germany, were signatories, and in which France and Spain were entrusted with the task of preserving order in disturbed Morocco, was supposed to have settled the Moroccan question, but the sudden appearance off A. of the Ger. gunboat, the *Panther* (replaced later by cruiser *Berlin*), and the demand of the Ger. Kaiser for 'a place in the sun,' precipitated a feeling of exasperation in France, which, had it eventuated in war, would have inevitably embroiled England. The prolonged negotiations or 'conversations' between the 2 countries resulted in Germany agreeing to forgo her claims in respect of Morocco, in exchange for which certain portions of Fr. Congo were ceded to her. Pop. 2500.

**Aga Khan, Aga Sultan, Sir Mahomed Shah** (b. 1877). Head of Ismaili Mohammedans. Rendered loyal service to Great Britain during the First World War, and was granted the rank and status of first-class chief. Has numerous religious followers in E. Africa as well as in India and Central Asia. Well known for his horse-racing activities. Pub. *India in Transition*, 1918.

**Agallochum**, see ALOES WOOD.

**Agalmatolite** (Gk. ἀγάλμα, image, λίθος, stone), or **Pagodite**, a hydrous silicate of aluminium, grey to pale green and red, which is used in China in the sculpture of small statues and other objects.

**Agama**, a genus of lizards of the family Agamidae (q.v.), native to Africa and India. It is of sombre colour, has a triangular head, conical tail covered with scales, is capable of inflating the skin, and inhabits ruins and rocky places.

**Agamedes**, the legendary son of Erginus, king of Orchomenus. He and his brother Trophonius were regarded as supernaturally gifted architects. They built a treasure house for the king of Myria and systematically robbed it by means of a loosened brick. On discovery

of A., his brother cut off his head and fled, to be swallowed up by an earthquake. According to a tradition mentioned by Cicero, the two brothers, having built a temple to Apollo at Delphi, prayed the god to grant them whatever reward was best for man. This was promised them on a certain day, and on that day they died.

**Agamemnon** was the son of Pelistes and Acropo or Eriphyle, and grandson of Atreus, king of Mycenæ. According to Homer he was a son of Atreus and grandson of Pelops. After the murder of Atreus, A. and his brother Menelaus went to Sparta, where A. married Clytemnestra, sister of Helen. He became king of Mycenæ, and commander-in-chief of the Gks. in the siege of Troy. At Aulis, where the army and fleet assembled, A. killed the favourite stag of Artemis (Diana), for which deed a pestilence and calm were produced, causing a delay in the start. To avert the anger of the gods, A. consented to sacrifice his daughter Iphigenia, but she was carried off by Artemis, and another victim was selected. The army then sailed to Troy, and the quarrel between A. and Achilles is one of the most memorable events of the siege of Troy. When Troy was taken A. received Cassandra, the daughter of Priam, as his prize; and on his return home he was murdered by Ægisthus and Clytemnestra, his wife. His murder was avenged by his son Orestes, who killed Ægisthus and Clytemnestra. The Gk. tragedians Æschylus, Sophocles, and Euripides make these legends the subject of several of their plays.

**Agami**, the native name for the trumpeter of tropical S. America, to which Latham has given the name of *Psophia crepitans*. It belongs to the Gruiformes, and is closely allied to the cranes. It is a beautiful, many-coloured bird, gregarious, easily tamed; it chooses mts. and upland forests for its home, and feeds on insects and fruit. The eggs, 10 to 16, are laid in a scratched-out hole, the young are covered with down, and the mature bird is about the size of a pheasant. Its name is obtained from its trumpet-like cry.

**Agamidæ** (Gk. ἀγάμ, without, γάμος, marriage, ἄδος, form), a family of saurian reptiles, or lizards, which has the agama for its type. It includes the *Chlamydosaurus* of Australia, which runs on its hind legs and has a curious frill on each side of its neck; the *Draco*, or flying dragon, common to Java; the *Moloch*, an Australian lizard, whose body is covered with large spikes; the *Calotes* of India, which changes its colour.

**Agana**, or **San Ignacio de Agana**, fortified cap. of Guam, Ladrões Is. Its port is San Luis de Apra. Pop. 9000.

**Aganippe** is a celebrated fountain in Boeotia. It is situated at the foot of Mt. Helicon. The Permessus receives it. The fountain was held to be sacred to the muses, who were named Aganippides from their association with it.

**Agapæ**, from the Gk. word ἀγάπη, meaning love, signifies love-feasts. They

were founded in connection with the Lord's Supper. The spirit of charity which is responsible for the name of the function pervaded the banquet, the rich supplying food to which the poor were invited. For a time the A. and the Lord's Supper were celebrated together during the evening, but the persecution of the Christians compelled them surreptitiously to observe them at separate times, often before dawn. Subsequently a formal separation was made. From the third century the banquets deteriorated in character, and the clergy were ultimately forbidden to take part in them. Owing to the extreme freedom from moral restraint which marked the proceedings, the whole ceremony was banned by the Church.

**Agapanthus** (Gk. *αγαντη*, love, *ἄθος*, flower), a genus of African plants belonging to the Liliaceæ. *A. umbellatus* is a common garden flower.

**Agapemonites**, the name given to persons who were members of a community which was founded by H. J. Prince, a former clergyman of the Church of England, and his rector, Starkey, at Charlynch near Bridgewater (Somerset) in 1859. The community lived in a single building, sharing their possessions under the leadership of Prince, whom they termed 'the Lord.' Agapemone, the name of the community, means 'the abode of love.' There were similar societies in England before this one, e.g. the Family of Love, in the sixteenth century, and also a later one about 1896 known as 'The Children of the Resurrection,' who built a place at Clapton, which they called the Ark of the Covenant. It is not fully established whether Prince really permitted or proclaimed free love at the Agapemone, but that there were serious breaches of decorum and manners there is evidenced by the proceedings taken in the Chancery Court in 1860.

**Agapetæ** (from Gk. *αγαπητός*, beloved), virgins of the early Church who were associated with bishops, priests, and deacons, being bound to these celibates by spiritual love and attending to their material needs. Originally a beautiful institution, it was later abused, and consequently was suppressed by the Lateran Council of 1139. It was denounced by several councils of the fourth century, by St. Jerome, St. Chrysostom, and the Emperor Honorius.

**Agapetus I.**, pope of Rome from 535 to 536, assisted in the establishment of a library of eccles. books at Rome and deposed Anthimus, the patriarch of Constantinople. He d. at Constantinople, where he had been sent by Theodahad, king of the Goths. The Rom. Catholic Church celebrates his festival on Sept. 20, the Gks. on Apr. 22.

**Agapetus II.**, a Rom. by birth, pope from 946 to 955, appealed to Otto the Great of Germany against Berenger II., king of Italy, and attempted to free Rome and the papacy from degradation.

**Agar-agar**, otherwise known as Bengal or Japan isinglass. It consists of slices of

the dried stem of seaweed. It is similar to gelatine, though it requires more heat to liquefy it after it has once assumed jelly form. Its prin. use is as an artificial culture-medium for bacteria.

**Agardh, Karl Adolf**, a Swedish botanist, b. in 1785 at Lund. He became prof. of botany there in 1812. Later he entered the Church, becoming bishop in 1859. He wrote voluminously upon the algae, and on these great works our present knowledge of that botanical division is based. His son, Jacob Georg, succeeded him in the professorial chair (1854-79), contributing further revelations concerning the algae.

**Agarius** is a genus of fungi, of the subclass Basidiomycetes, which comprises the mushrooms. It contains numerous species, some edible and some poisonous; among the former are *A. campestris*, the common mushroom; *A. pratensis*, the fairy ring mushroom; and *A. Georgei*, a large mushroom, while the latter includes *A. muscarius*, fly agaric, and *A. arvensis*, horse mushroom. Plants of this genus grow on rocks, heaths, meadows, and decaying vegetable matter over the whole of Europe; *A. melles* is most destructive to timber.

**Agasias**, a Gk. sculptor of Ephesus of the first century B.C. The statue called 'The Borghese Gladiator,' now in the Louvre, was his work.

**Agassiz, Jean Louis Rodolphe** (1807-1873), celebrated naturalist, b. at Motier in Switzerland. He was educated first at home, and afterwards at the academy of Lausanne. He adopted medicine as a profession, studying at Zurich, Heidelberg, and Munich. In 1829 he took the degree of doctor of philosophy, and in the following year that of doctor of medicine. From that time he gave his energies to the study of ichthyology, and became the most eminent authority on the subject. He was asked, previous to graduating, to complete a hist. of the freshwater fish of Brazil, which had been commenced by Spix, who d. while on the work. His brilliant success earned recognition from Cuvier who became his friend. In 1831 he accepted a professorship at Neuchâtel. He gained the London Geological Society's Wollaston prize by the publication of his *Researches on the Fossil Fishes* (5 vols. of this work appeared between 1833 and 1844). In 1840 he began a study of the glaciers of the Alps, expressing his views in the *Études sur les glaciers* and his *Système glaciaire*. Previously (1839) he had written a *History of the Freshwater Fishes of Central Europe*. In 1846 he went to America and delivered a course of lectures on zoology at the Lowell Institute, expounding his theories on the 'Plan of the Creation.' These lectures were most successful, and in 1848 he was appointed to the chair of zoology and geology at Harvard, and made expeditions of a scientific nature to Lake Superior. Distinction after distinction followed, and he had to decline invitations from Paris and Zürich to accept professorships. Incessant work had meanwhile undermined his health, and a

holiday, afterwards an organised scientific expedition to Brazil, was arranged. He d. at Cambridge, Massachusetts, while engaged on the compilation of *Contributions to the Natural History of the United States*.

His son Alexander (1835-1910) was b. at Neuchâtel, and graduated at Harvard in 1855, studying chem. and engineering. In 1859 he became an assistant in the U.S. Coast Survey, taking a great interest in mining. Incidentally he amassed a fortune from some copper shares which he held. He made a collection of Peruvian antiquities for the Harvard museum, and became its curator. Among his other interests riv. dredging occupied a large place. His works include a *Review of the Echini* (1872-74), *Seaside Studies in Natural History* (1865), and *Marine Animals of Massachusetts Bay* (1871).

**Agastya**, a Brahman saint, who is supposed to have been the founder of Tamil literature, and who is said yet to dwell as a *yogi* on the peak of Agastya-malai, a hill in Travancore. The construction of the pond called Vishnu Pushkarni Tirth in Bombay is accredited to him.

**Agate**, a mineral comprising all the many forms of silica, chiefly chalcedony. Most As. exist in rounded nodules or in veins in trap rocks. Among the numerous kinds of As. are the cornelian, amethyst, quartz, jasper, opal, and flint. The stones are easy to polish and are much used for ornamentation. They are probably formed by deposits of water containing silica in lava when viscous. The slow movement of the lava explains the drawn-out elongated shape of A., and on account of this almond shape, the name amygdalæ has been applied to them. When depositions have not occurred sufficiently to fill the hollow in the lava, the A. is hollow. A considerable industry in A.-working has been carried on in Germany around Oberstein. The dist. is rich in amygdaloid rocks of andesitic types. At the present day, however, the As. themselves are imported from Brazil. Naturally unattractive, As. are artificially stained, an art which is of anct. origin. The colorations are many, the chief being dark brown, red, blue, green, and yellow, while the appearance of others gives rise to the names star As., moss As., and clouded As. Many are found in Scotland under the name of 'Scotch pebbles.' Besides ornamentation, As. are used in the making of knife-edge fulcrums for delicate balances, and for the manuf. of small pestles and mortars. Some of the finest As. come from Ontario, a dist. on the edge of Lake Ontario being called A. Bay. Another variety is that manufactured from wood obtained from the silicified forests of Arizona. India, New S. Wales, Queensland, and Africa also produce As.

**Agatha, St.**, the patron saint of Catania, Sicily. According to a legend she was a Sicilian noblewoman of great beauty, who refused the love of the Rom. prefect. She was sentenced to be burnt

alive, but at the application of fire to the stake an earthquake occurred. She d. in prison and was numbered among the Rom. Catholic saints. Her festival day is Feb. 5.

**Agatharchides**, or **Agatharchus**, was a native of Cnidus, and a contemporary of Ptolemy Philometor (187-146 B.C.). He is celebrated as a Gk. historian and geographer. His works include a treatise on Asia, Europe, and the Red Sea. Preserved by Photius are interesting and valuable extracts from this last work. Photius commends the style of his writings, which was modelled on that of Thucydides.

**Agatharchus**, an Athenian painter of the fifth century B.C. Vitruvius says he was the first painter to execute scene-painting, but his only work in this direction was the front of a stage building which could be used, and was, on all occasions. He was seized by Alcibiades and compelled to paint the interior of his house, an event which proves the popularity of the decorative painting of rooms.

**Agathias** (A.D. 536-82), a Gk. poet and historian of Æolis. He studied law, and practised in the courts of Constantinople. Literature, however, became his favourite pursuit. He wrote sev. short love-poems called *Daphniacæ*, and compiled an *Anthology of Epigrams*. He wrote a hist. of his own times in 5 vols., which is the chief authority on the period 552-58.

**Agathis**, a genus of Conifere with broad, lance-shaped, leathery leaves, native of the E. Indies and Australia; the resin makes varnish. *A. Dammara* is the dammar pine, *A. Australis* the kauri or cowrie pine.

**Agathocles** (361-289 B.C.), tyrant of Syracuse, was b. at Therma Himeræ in Sicily. His father was a potter, and A. was put to the same trade. After learning the business he joined the army. In 333 he married the widow of his patron, Damas, a distinguished and wealthy citizen. He was banished from Syracuse for endeavouring to overthrow the oligarchy. In 317 he returned at the head of an army of mercenaries, and after his triumph he made a solemn oath to fulfil the ideals of the democratic institution now raised by him. A wholesale massacre was perpetrated of over 1000 citizens who resisted his authority. He made himself master, however, and, with the aid of a strong army and a powerful fleet, succeeded in conquering nearly the whole of Sicily. He now engaged in a war with the Carthaginians, and was repulsed by them, till in 310 he was besieged in Syracuse. With an intrepidity characteristic of his methods, he courageously broke through their lines and attacked them in their own country. After a series of victories he was defeated, and abandoning his army to the mercies of the Carthaginians, fled secretly to Sicily. Peace with Carthage followed, and A. had himself proclaimed king of Sicily, and ruled with a firmness that earned him his name of tyrant. Until his death he displayed consistently extraordinary energy in

whatever he strove to acquire, and was, in fact, meditating a fresh attack on Carthage when his death occurred. Ill health and the turbulence occasioned by the revolt of his grandson harassed his last days. Some authorities aver that he d. poisoned by his grandson Archagathus, while others state that he met his death naturally.

**Agathodæmon**, a map designer of Alexandria who lived probably about the second century A.D. Ptolemy's *Geography* contains in the MS. 27 maps said to have been executed by A.

**Agathodæmon**, in Gk. mythology, a spirit of good fortune attendant particularly upon cornfields and vineyards. Wine was drunk in his honour after every meal.

**Agathon** (c. 447-100 B.C.), a poet of Athens famous for his tragedies. In modern times he is best known by his appearance in the *Symposium* of Plato, which immortalises the banquet he gave to celebrate his first tragic victory in B.C. 417. Aristotle remarks upon the originality of his plots, the custom being, at the time, to borrow them from mythology.

**Agave**, a genus of plants belonging to the order Amaryllidaceæ, found mostly in Mexico. It somewhat resembles the aloe, and on that account is often confused with it. Its beauty is remarkable. The best known species is the *A. Americana*. The plant grows to a height of 24-36 ft. Its roots possess detergent qualities, and are therefore used in large quantities for washing purposes.

**Agbatana**, see ECBATANA.

**Agde**, a tn. on the Mediterranean coast in the dept. of Hérault, France. It is near the mouth of the R. Hérault, and has a considerable trade in wines. Pop. 9000.

**Agdistis**, see CYBELE.

**Age**, in common law, at which a marriage is valid is 12 for a girl and 14 for a boy. In 1929 an Act was passed raising this A. to 16 years. The A. which gives the privileges of an adult, and at which a person ceases to be an 'infant' in the eyes of the law, is 21; the computation of these years is curious, for the day of birth is included and fractions of a day are unconsidered, so that a person may attain his majority nearly 2 days before his twenty-first birthday. The canonical A. in the Rom. Catholic Church is 21 for a sub-deacon, 22 for a deacon, 24 for a priest, 30 for a bishop. In the Anglican Church a man may become a deacon at 23, and a priest at 24.

**Age of Animals** is difficult of determination, as it can be studied only in creatures in captivity, the unnatural conditions tending to shorten life considerably. Among the low forms of life a sea anemone (*Actinia mesembryanthemum*) lived in captivity from 1828 to 1887 in the botanical gardens of Edinburgh, while a gastropod, *Tridacna gigas*, lived for a century; oysters and edible snails exist for about 4 years, while crabs can attain 50 years. Insects frequently die after a few hrs. or months, though the larva may have endured for sev. years. Lord Averbury kept an ant

once for 15 years; among bees the workers die soon, while the queen may reign for 5 seasons. Fish are usually devoured by larger species, but the more ferocious sometimes survive for an enormous period, a pike having been known to live for 267 and a carp for 200 years. Tortoises are said to exist for 2 centuries, while crocodiles exist for 1; frogs die sooner than toads, which may live for 36 years.

Fish and reptiles are longer lived than birds and mammals. Small birds, such as canaries, average about 15 years in captivity, though parrots and swans may live for 80, eagles and falcons for 100 years. Prolific animals are usually short-lived, swine seldom passing 20 years; large rodents, such as hares and rabbits, 10 years; small rodents, such as rats and mice, 5 years. Among domestic animals, cats may live 12 to 25, dogs 16 to 18, horses and asses 15 to 30, cattle 25 to 30, sheep and goats 12 to 14, deer 10 to 15 years. Wild animals, such as the elephant and the hippopotamus, cannot be fairly judged in captivity, but under such a condition they have attained 35 years. Monkeys soon die when in this cold climate, and lions do not here reach their estimated 30 years.

The determination of the A. of domestic animals is usually accomplished by noting their dentition. In sheep and goats the incisors appear during the first month, the first permanent molars by the sixth month, the milk-teeth fall at the age of 2 years, the true molars are complete in the fifth year. The milk-teeth of a dog come out between the third and fourth month, and the animal ceases to be a puppy at the ninth month. In horses the front incisors appear at the end of 8 days, the middle at the end of 5 weeks, the back between the sixth and eighth month. They show signs of wear in order of appearance; at 2 to 2½ the front teeth fall and are replaced; at 3½ to 4 the middle teeth, and at 4½ to 5 the back incisors. At 6, 7, and 8 respectively, the front, middle, and back teeth decay. In cattle both dentition and the rings on the horns indicate A., the first ring appearing at the A. of 3. The A. of a stag can be ascertained approximately by the branches of the antlers up to the seventh year, but the oldest stag never has more than 10 or 12 branches. See G. L. L. Buffon's *Histoire naturelle*, 1749; Sir E. Ray Lankester's *Comparative Longevity in Man and the Lower Animals*, 1870.

**Age of Discretion in Law** is the time at which an infant is supposed to have attained sufficient understanding to judge of the morality of his actions. In criminal law an infant under 7 is not held guilty of felony, a boy under 14 cannot be guilty of carnal knowledge of a girl under 13 years—though he may be convicted of assault—and it is a misdemeanour for one over 16 years of age to ill-treat a child under 16 who is in his charge.

**Age in Physiology** is divided into 5 periods of development and decay in human-kind—infancy, which extends to the end of the seventh year, childhood

to the fourteenth, adolescence in males and females varies, but averages to about the twenty-first year, adult life to about 50 years, and after that period comes old A. The limits of human existence are unknown, but Thomas Parr ('Old Parr'), the oldest known Englishman, whose dates are not properly authenticated, is said to have *d.* at the A. of 153. Cases of persons attaining a century of existence are of common occurrence.

**Age of Trees** may be computed by cutting a section of the stem and counting the number of concentric ann. rings. These rings are formed by the difference in constitution of the wood in autumn and spring, the latest-formed xylem bundles in a year being much smaller than those of the spring. The oak, elm, and ash show this difference, but it is not so clear in such trees as the beech and lime. Many trees attain to a great A., e.g. the oak, which reaches maturity between 120 and 200 years, and of which sev. examples are known to be 1000 years of A. Many yews are quite 3 centuries old, while the Scots pine (*Pinus sylvestris*) has frequently weathered 400 years.

**Agen**, a city in S.W. France, and cap. of Lot-et-Garonne. The tn. is old and presents a depressing appearance. It carries on a trade in woollen and linen goods, and is an important railway centre. Jamain, the poet (q.v.), was b. there. Pop. 24,900.

**Agent**. An A. is one who is authorised by another to do acts for him and in his name, the person who authorises him being called the principal or constituent. There are many kinds of As., public and private, and they are known by many names, such as broker, bailiff, factor, ambas., consul, etc., and the title of A.-general is borne by many Brit. colonial officials who represent the self-governing colonies in the home country. For transactions other than those of minor importance it is usual for an A. to receive his appointment in writing, and an A. by deed cannot bind his principal otherwise than by deed. The granting of such instructions is called the granting of 'power of attorney.' An A. acting under a commission *del credere*, i.e. undertaking to be surety to his principal for the solvency of his principal's customers, is, in these customers' default, held accountable for debt, but in all other cases he is not liable. As a general rule the act of an A. is considered as an act of the principal, and the principal is in general liable for damage occasioned to third persons by the negligence or unskillfulness of his A.

**Agent Provocateur**, one employed, during political or social conflicts, in the guise of an adherent, to stir up compromising action. The method was much in vogue in Tsarist Russia when the Gov. used As. Ps. to foment risings for the express purpose of having an excuse for suppressing revolutionary movements. They have also been used in other countries in the struggle between govs. and revolutionary movements. Also, in labour disputes, their purpose is

to try and induce strikers to commit unlawful acts to provoke armed clashes. In international politics As. Ps. have been used to provide pretexts for interventions in wars by promoting disorder or bringing about 'incidents.'

**Ages of the World**, periods into which the hist. of the world is divided, each period being marked by some special feature. The idea originated among the Gks., and in the works of Hesiod 5 periods are mentioned: 1. The Golden A., when Saturn reigned, was a time of perfect innocence and happiness, without work. 2. The Silver A., when Jupiter reigned, was a time of godlessness, when troubles and labour commenced. 3. The Brazen A., when Neptune reigned, in which war, violence, and lawlessness prevailed. 4. The Heroic A., which was an improvement on the Silver and Brazen As. 5. The Iron A., when Pluto reigned and Hesiod himself lived, was the most miserable and wicked of all, for virtue had gone out of the world. Ovid, in his *Metamorphoses*, mentions the Golden, Silver, Brazen, and Iron As. European hist. has also been divided into periods, as: The Middle As. (q.v.), or the period after the fall of Rome until the fifteenth and sixteenth centuries, which were marked by the Reformation and the discovery of America. The Dark As. (q.v.), a period marked by the decline of classical learning and civilisation, extended from the inroads of the barbarians into Europe until the time of the Renaissance. It is also common to speak of such periods as the Homeric A., the Augustan A., and the Elizabethan A.; and also the Stone A. and the Bronze A.

**Aggershuus or Christiania**, a div. of Norway. Area, 2063 sq. m. Pop. 237,000.

**Agglomerate** consists of a large mass of blocks or bombs of all sizes and shapes. It is of volcanic origin, and is frequently found in the necks of the craters of ant. volcanoes. These blocks sometimes consist of igneous rocks, sometimes of sedimentary rocks, and sometimes of both.

**Agglutinative Languages** are those languages which have long compound words, consisting of the prin. word and the qualifying words, and are distinct from the inflectional languages. The prin. A. L. are the Mongolian, Turkish, Finnish, Hungarian, N. Amer., and the Dravidian (Tamil and Telugu, etc.) in S. India.

**Aggression**, a term first used officially in the treaty of Versailles, 1919, which speaks of 'the aggression of Germany.' It is incorporated in the 'Covenant of the new defunct League of Nations, member States undertaking 'to respect and preserve against external aggression the territorial integrity and existing political independence of all members' (see COVENANT OF THE LEAGUE OF NATIONS). The Mutual Assistance Pact, 1923, and the Geneva Protocol, 1924 (q.v.), were vain attempts to found the definition of an 'aggressor nation' on rejection of arbitration. In 1944 the Dumbarton Oaks Conference produced a plan that, unlike the

'call to repentance' of the Covenant, invoked no principles, but contained practical arrangements for restraining an aggressor. The conference looked to a 'Security Council' to decide whether the conduct of a nation amounted to A. and, in fact, alone to shoulder the burden of keeping the peace. These proposals were incorporated in the following year in the Charter of the United Nations. See SAN FRANCISCO CONFERENCE; UNITED NATIONS CHARTER.

**Aggtelek**, see AGTELEK.

**Aghrim**, or **Aughrim**, a vil. in the co. of Galway, Ireland. It is famous historically on account of the victory of the forces of William III. over Ginkel over the Irish and Fr. forces of James II. under St. Ruth. St. Ruth was killed. Pop. 200.

**Aghuat**, El, see LAGHOUAT.

**Agila-wood**, see ALOES WOOD.

**Agilochum**, see ALOES WOOD.

**Agincourt**, a vil. of N. France, situated in the department of Pas-de-Calais. It owes its notoriety to the famous battle fought there between Henry V. of England and the Fr. The Fr. possessed overwhelming numbers, but the cumbersome armour with which they were covered and the muddy nature of the intervening ground, due to heavy rains, nullified their practical superiority. On Oct. 25, 1415, the armies faced each other. A pause followed, during which each expected the other's attack. At length Henry's archers opened the assault with dense flights of arrows. The Fr. replied with a charge. Fortunately for the Eng., the condition of the ground caused considerable confusion among the cavalry, who now found the greatest difficulty in extricating themselves from the clinging mud. They provided an admirable target for the Eng. archers, who proved themselves worthy of the reliance placed upon them. A *mêlée* followed, during which the Fr. suffered appalling loss of life, eventually yielding over 1000 prisoners of war, among whom was the Duke of Orleans (in literature Charles d'Orléans). The slain, lying in places 3 and 4 deep, included the Constable, 3 dukes, 5 counts, and over 90 barons. While the Eng. losses are estimated at a few hundreds, the wholesale slaughter of the Fr. resulted in no fewer than 10,000 dead.

**Agio** (It.), a term denoting difference between (i.) actual and face value of money; (ii.) the metallic moneys of different countries; also appreciation or depreciation from fixed rates of exchange.

**Agira**, tn. of Catania, Sicily, 9 m. S.E. of Nicosia. It is the ant. *Agryrium* and was till recently known as San Filippo d'Argiro. Contains a ruined Norman castle, and has sulphur mines and marble quarries. The bp. of Diodorus. Pop. 15,700.

**Agis**, the name of 4 Spartan kings, of whom the first is legendary, being supposed to have reigned in the eleventh century B.C. The historical A. I. (or II.), who reigned 427-399 B.C., was a

distinguished general, and led the Spartan army at the battle of Mantinea. A. II. (or III.) (388-331 B.C.) was a prominent member of the league of the (Grecian) states against Alexander the Great, and defeated the Macedonians under Corraus. He was killed in battle at Megalopolis. A. III. (or IV.), the most noted, who reigned 214-241 B.C., endeavoured to remedy the poverty of the Spartans by a system of land redistribution, but his schemes were suspected of being dangerous to the welfare of the state, and he was put to death.

**Agistment** (law), an agreement entered into with an owner of land, whereby the latter, known for the purposes of such agreement as the agistor, allows cattle to pasture and lie on his land; also, the profit accruing to a landowner from such transaction. In this latter sense the word applied formerly more especially to pasturage in the royal forests.

**Agnadello**, tn. of Cremona, Italy, 10 m. E. of Lodi. The site of 2 famous battles: on May 14, 1509, when the Fr., under Louis XII., defeated the Venetians; and on Aug. 16, 1705, when the Duke of Vendôme defeated Prince Eugene. Pop. 1500.

**Agnano, Lake**, situated in the crater of an extinct volcano near Naples, was drained in 1870 on account of its malarial properties. The waters are now used for remedial baths. On its shore is the famous Grotta del Cane.

**Agnate** (law). *Agnati* signified in Rom. law persons related through males only, *cognati* (cognates) being those in whose relationship one or other female link intervened. The distinction between *agnati* and *cognati* was founded on the peculiar institution of *patria potestas*. See FAMILY, THE; TWELVE TABLES.

**Agnes, Saint**, a beautiful Christian virgin in the reign of Diocletian, was, according to legend, in her thirteenth year publicly humiliated and executed in Rome for refusing the praetor's heathen son. Her festival is held on Jan. 21.

**Agnesi, Maria Gaetana** (1718-99), scientist and scholar, b. at Milan. In 1750 she succeeded her father in the chair of mathematics and natural philosophy at Bologna. Her prin. work was the mathematical treatise, *Istituzioni analitiche*, 1748.

**Agnew, David Hayes** (1815-92), an Amer. surgeon, b. in Pennsylvania; d. at Philadelphia. Served as surgeon in the Civil war. Pub. *Principles and Practice of Surgery* (1883).

**Agni**, in the Hindu religion god of the fire of sun and lightning.

**Agnolo, Baccio d'** (1460-1513), b. at Florence, where he acquired considerable reputation as a wood-engraver. He went to Rome to study architecture, and afterwards settled at Florence. His most important works are the villa Borghesini, near Florence, the campanile, or bell-tower, of the church of Santo Spirito (a production of Brunelleschi's) in Florence, the Bartolini and Orsini palaces, the choir stalls and organ-case of Santa Maria Novella. He was

in charge of the works of the cathedral of Florence.

**Agnone**, a tn. of Campobasso, Italy, on W. slope of the Apennines, 22 m. N.W. of Campobasso. Celebrated for copper mines and sulphur and other mineral springs. Pop. 3166.

**Agnosticism**, the name invented by T. H. Huxley in 1869 for the doctrine (in itself old) that man does not and cannot in the nature of things *know* anything about a spiritual existence either of God or man or of any after-death state. The term would appear to have been suggested to Huxley by the Gk. words *ἄγνοστος θεός* (To the Unknown God), which we learn from Acts xvii. 23, was the inscription which St. Paul found upon an altar in Athens. Certain it is that the teaching of agnostics is fundamentally contrary to that of the Gnostics (*q.v.*). The latter was an intensely mystical doctrine of the early Christian Church that claimed special revelation of the nature of the divine, while, on the other hand, the agnostic asserts that man's only cognition can be of the phenomenal world. This is not to say that there *may* not be a noumenal entity or soul behind the phenomenal—a First Cause—the 'thing in itself' of Kant, in fact, the agnostic would repudiate as dogmatic materialism or Atheism (*q.v.*) the denial of this possibility. Its one answer to all such questions is that we do not know and there is so far no reasonable grounds for believing that we shall ever know. In other words, man, being finite, can never comprehend the Infinite. In this country A. had many able exponents in the seventies and eighties of last century, chief among them being Huxley, Prof. Tyndall, and Herbert Spencer. The 'Belfast Lectures' of Tyndall and Spencer's *First Principles* did much to popularise A., but most of the conclusions of modern A. may be found in the works of Kant, the great Ger. philosopher. Two books for and against the theory are *An Agnostic's Apology*, by Leslie Stephen, 1893, and Dr. James Ward's Gifford Lectures, 1899, entitled *Naturalism and Agnosticism*.

See also R. Flint, *Agnosticism*, 1903; F. von Hügel, *The Reality of God and Religion and Agnosticism*, 1931.

**Agnus Dei** (Lamb of God), a title of Jesus; generally used to denote the symbol of Christ, a lamb supporting a banner, and more particularly the waxen or dough tablets bearing such image, distributed by the pope at Easter, and worn as amulets. The prayer in the Mass beginning *Agnus Dei, qui tollis peccata mundi* (O Lamb of God, that takest away the sins of the world) is also known by this name.

**Agonio Lines** (Gk. ἄγωνα, *agona*, angle), irregular imaginary lines on the earth's surface, passing through the magnetic poles on which the magnetic needle shows no deviation or declination, i.e. points true N. and S.

**Agora**, the public market and meeting-place of the anc. Gks., corresponding to the Rom. forum. Among the better-known *agoræ* are those of Athens,

Corinth, Messina, and Megalopolis. The name was also given to the people's assemblies of the Grecian states. See Gardner's *Ancient Athens* (1902) and the works of Pausanias.

**Agoraphobia** (Gk. ἀγορά, public place, φόβος, fear), a nervous disease, characterised by the sudden onset of symptoms of terror when the patient is in any busy open space, and by inability to cross it. The treatment is that for general neurasthenia.

**Agoué**, seaport in Dahomey, Guinea Coast, between Great and Little Popo, near the border of Togoland. Pop. 5500.

**Agouti**, Marie Catherine Sophie de Flavigny, Comtesse d' (1805-76), Fr. writer, b. at Frankfort and educated in a Paris convent. She left her husband, Comte d'A., to live with Franz Liszt, by whom she had 3 children, of whom Cosima married, as her second husband, Richard Wagner. Under the pseudonym 'Daniel Stern' she pub. *Néida* (1846), *Lettres républicaines* (1848), *Histoire de la révolution de 1818, et Esquisses morales* (1850-53). *Mes souvenirs* (1806-33) was pub. in 1877 and *Mémoires* (1833-54) in 1927.

**Agouti**, a S. Amer. rodent of the genus *Dasyprocta*, belonging to the same family as the guinea-pig. It does considerable damage among sugar plantations.

**Agra**, the headquarters of a dist. of 1856 sq. m., pop. 921,155, and of a div. of 8545 sq. m., pop. 4,182,825, in the United Provs., India. A. city, on the Jumna R., 840 m. N.W. of Calcutta, was for 150 years the cap. of the Mogul rulers, but was superseded in 1658 by Delhi as the seat of their gov. It was captured from the Mahrattas by Lord Lake in 1803, and was unsuccessfully besieged for some months during the Mutiny. Its most famous feature is the wonderful Taj Mahal, the marble tomb built for his favourite wife by Shah Jehan, who was also responsible for the other outstanding architectural features of the city, the Moti Masjid, or Pearl Mosque, and the Jama Masjid, or Great Mosque. In the suburb of Sikandra is the mausoleum of the city's founder, the emperor Akbar. The old city of A. covered 11 sq. m., half of which is still inhabited; the fort has a circuit of over a m., with walls 70 ft. high. The city is a busy railway and commercial centre, with cotton mills, flour mills, and carpet industry; the local manufs. are gold and silver embroidery, carving in soapstone, inlay work on white marble, carpets, and boots. Pop. of city 230,000.

**Agra and Oudh, United Provinces of**, see UNITED PROVINCES.

**Agram**, see ZAGREB.

**Agrarian Laws**, see LAND LAWS.

**Agreement**, see CONTRACT.

**Agricola**, Gaius (1490-1555), Ger. metallurgist, his Ger. name being Georg Bauer, was b. Mar. 24, 1494 (some biographers give the year 1490, but the best authorities accept 1494) at Glauchau, Saxony, and educated at Leipzig Univ.

Studied philosophy, medicine, and natural science in Italy. Became tin-physician in Bohemia in the midst of a mining dist., where he studied the mines and metallurgy. In 1530 there was pub., by Froben at Basel, his dialogue *Bermannus*, a catechism of mining. In 1533—about which time he became city physician of Chemnitz—he issued *De Mensuris et Ponderibus*; and then he began writing his chief work, *De Re Metallica*, which, however, did not appear till after his death. *De Ortu et Causis Subterraneorum*, in 5 books, was pub. 1546. He was a member of the Diet of Freiburg, went afterwards on political missions to sev. foreign princes, and attended Diets at Leipzig, Torgau, and Dresden. An Eng. translation of *De Re Metallica*, by Herbert Clark Hoover (later president of the U.S.A.) and Lou Henry Hoover, was pub. with the original illustrations, in a thick folio vol., in 1912.

**Agricola, Gnaeus Julius** (A.D. 37–93), Rom. soldier and statesman, was distinguished by ability and the integrity of his character. He was elected consul in A.D. 77, after a brilliant career in Britain and other outposts of the empire. From A.D. 78 to 87 he was governor of Britain, where he estab. the Rom. dominion considerably N. of the Forth, defeating the Caledonians under Galgacus in the battle of the Grampians. His fleet sailed round Britain and discovered it to be an is. for the first time. His success aroused the jealousy of the emperor Domitian, who recalled him to Rome, where he spent the rest of his life in retirement. The story of his life by his son-in-law Tacitus (trans. Church and Brodribb, 1877) is one of the finest biographies in any language.

**Agricola, Johann** (1491–1566), a pioneer of Protestantism, also known as *Magister Eisleben*, from his bp. Eisleben, was educated at Wittenberg and Leipzig. After being sent by Luther to Frankfurt in 1525, to establish there the reformed religion, he preached for some time in Eisleben. In 1536 he was appointed to a chair at Wittenberg, but was compelled to resign in 1540 owing to his Antinomian controversy with Luther and Melancthon. He left for Berlin, where he was appointed court preacher to the Elector Joachim II. of Brandenburg. He wrote many theological books, but his best-known work is his famous collection of Ger. proverbs, 1528. See Kawerau, *Johann Agricola*, 1881, and Latendorf, *Agricolae Sprichwörter, ihr hochdeutsche Ursprung*, 1862.

**Agricola, Rodolphus** (1443–85), b. near Groningen, Friesland, and d. at Heidelberg. He was educated at Louvain, then went to Paris and Ferrara, where he attended the prelections of Theodoro Gaza on the Gk. language, and also gave lectures on the language and literature of Rome. He visited Rome, returned to Holland, and then went to Heidelberg in 1482. He was a great scholar (his most important work being *De Inventione Dialectica*), a musician, and a painter.

**Agricultural Adjustment Act**, an Act

passed by the U.S. Congress in 1933 in order to assist Amer. farmers. It provided for the setting up of an A. A. Administration to regulate prices of agric. products, partly by subsidising farmers in consideration of restricting cultivated acreage in accordance with a policy of soil conservation, and partly by purchasing and storing surpluses. For these purposes the A. A. Administration spent some 500,000,000 dols. annually. It was originally intended to secure reimbursement of the subsidy by taxes on industries engaged in processing agric. products, but the Supreme Court in 1936 declared these taxes void and funds had to be appropriated from other budgetary sources.

**Agricultural Bureau, Imperial**, an inter-imperial organisation, composed of nominees of the United Kingdom, the dominions and India, and of the Colonial Office, set up in 1929 to administer a number of bureaux so organised as to act as clearing houses of information on research in various specialised fields of agric. science, and financed from a common fund provided by the Govs. of the empire; these Govs. instructed it in 1933 to supervise the administration and finances of the Imperial Institute of Entomology and the Imperial Mycological Institute and in 1937 to organise bureaux for forestry and dairy science. The executive council of the bureaux submits ann. reports to each of the Govs. concerned. The bureaux are attached to appropriate research institutions, but are distinct from them.

**Agricultural Credit** is defined as 'a means of facilitating the flow of capital into agriculture wherever it can profitably be used for these purposes.' It embodies the problem of finding 'an adequate agricultural substitute for the industrial joint-stock method of obtaining working as well as initial capital.' These 2 capital needs of agriculture are met by the short-term, the intermediate, and the long-term credit.

**Short-term credit** is necessary to the farmer to finance marketing operations. Without this credit he may be forced to put his produce prematurely upon an unwilling market in order to meet his immediate liabilities. In the U.S.A. and Australia co-operative marketing associations receive the produce from the growers and make them an advance upon it. In Great Britain the best source of short-term credit is from the joint-stock banks. The security is that afforded by title-deeds, etc., or the loan may take the form of an overdraft. Agric. wealth—stocks and crops—is not a recognised security with a bank, except by a bill of sale, and the publicity attaching to this form of advance prejudices it in the eyes of the farmer.

**Co-operative credit** in Great Britain had some provision made for it under the Agricultural Credits Act, 1923. It was not successful, owing to the reluctance of the individual farmers to use the provisions, and the State has since withdrawn its financial support. On the continent the co-operative system on the



Raiffeisen model, originated in Germany, has been a conspicuous success, depending as it does on the deposits of a large number of peasant proprietors rather than on the resources of the State, as in Great Britain.

*Long-term credit* is not the business of the joint-stock bank. In Great Britain there had been no machinery enabling the farmer to obtain long-term or intermediate credit, necessary for farm purchase or permanent improvement. Provision is made under the Agricultural Credits Act, 1928, for long-term loans to be made to farmers by an agric. mortgage loan company, assisted financially by the Treasury. Under this Act the farmer's short-term requirements are also met by a floating charge on his stock and crops.

A proposal to inaugurate a Central Land Bank was put forward in the *Report on Agricultural Credit* (Economic Series No. 8), pub. by the Ministry of Agriculture in 1926. The sequel was the creation of the Agric. Mortgage Corporation—the first agric. mortgage bank to be estab. in Great Britain. The corporation is owned by banking and financial institutions and the dividend is limited to 5 per cent.

**Agricultural Holdings.** A Consolidating Act was passed in 1923 repealing and re-enacting, with changes, the Agricultural Holdings Acts 1908 and 1913, and the Agricultural Act, 1920. Under this Act a tenant has a right to compensation for improvements whether the improvement was or was not one which he was required to make by the terms of his tenancy. A schedule to the Act enumerates the improvements to which the landlord's consent is required. They include the erection or alteration of buildings; laying down permanent pasture; planting osier beds; irrigation works; gardens; making roads or bridges, water-courses, ponds, wells, permanent fences; reclaiming waste land; planting of orchards or hops; sluices against floods; and, in the case of arable land, the removal of bracken, boulders, etc. The tenant also has a right to compensation for damage by game, where the right to kill and take the game belongs to someone else. Compensation for disturbance of his tenancy is payable for some other reason than failure to cultivate the holding properly or to pay the rent due, or bankruptcy, or breach of some term or condition of his tenancy. By the Agricultural Land (Mobilisation) Act of 1931 the Ministry of Agriculture is empowered to provide small holdings, with financial assistance, for unemployed persons, or for agric. workers or suitably trained ex-service men. But the Ministry must be satisfied that the person is not of sufficient means to enable him to obtain a small holding from the co. council.

**Agricultural Machinery and Implements** have undergone in the twentieth century a rapid development, chiefly in the direction of adapting mechanical power (steam, petrol, or electricity) to their use. For motive power 3 classes of engines are

used: the portable, tractor, and stationary. The portable engine, mounted on road wheels, when not needed for threshing can be bolted up to any of the machines used on a large estate for such operations as sheep-shearing, wood-sawing, etc. The tractor is used for ploughing and harrowing, and can haul mowers, binders, etc. Steam ploughing has been largely superseded by motor-tractor ploughing. For a type of tractor the high-speed engine on a light frame certain has advantages, but the heavy tractor, if the soil can carry it, saves expense in repairs. The stationary engine can be installed in the barn or shed to drive fodder and dairy machines. The usual type is a vertical engine with multi-tubular boiler. Electric motors are sometimes used.

The various agric. implements may be classified under the following heads:

**Tillage Implements.**—Ploughing breaks up the soil into furrows, exposing it to the action of the atmosphere. Steam ploughing is not so successful as horse or tractor ploughing, but both plough and tractor must be adapted to the particular soil. Two distinct types of plough are the mouldboard plough and the disk plough, the former being more widely used. The function of grubbers, or cultivators, is to rend the soil with their curved teeth. The newest form of cultivator has a steel frame with sickle lines, able to penetrate the hardest ground. The spike-tooth or drag harrow is used to prepare the seed-bed after ploughing. The disk harrow is suitable for a stubble surface, and the spring-tooth harrow for hard or stony ground. Rollers are used to break up the clods and to smooth the surface after sowing. The most common type is the ring-roller. Various kinds of horse-hoes are used to stir the soil while the crops are still growing, at the same time destroying weeds.

**Seeding Machines.**—Seed-sowing machines scatter the seed either broadcast or in furrows, according to the class of seed sown and the crop required. The seed drill deposits the seed in the soil at equal depths, and there is a device for covering the seed with fine soil after it has been deposited. The potato drill is a machine having cups on an endless chain, which lift the tubers from the hopper and plant them at regular intervals.

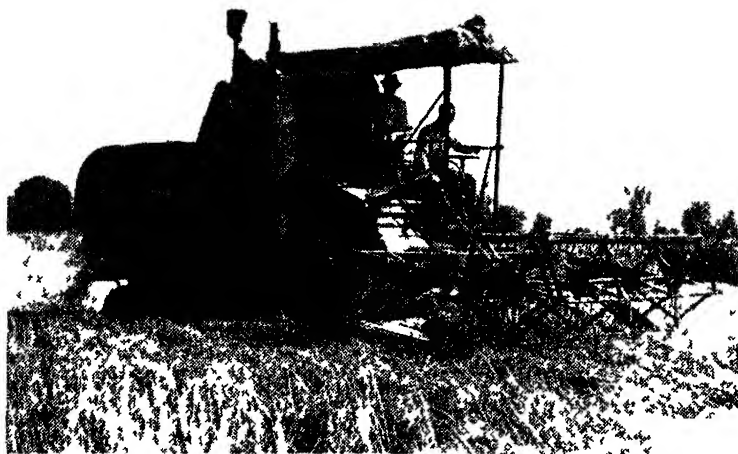
**Harvesting Machinery.**—The self-binder cuts the standing corn and passes the cut corn on to a sheafing deck, where it is bound and knotted and finally ejected on to the ground. For hay harvesting the reaper works in connection with the swath-turner and collector. There are also machines for loading, stacking, and pressing the hay. For potato-raising the machine is fitted with forks, which throw out the potatoes without bruising or scattering them; a new type of potato harvester, whose manufacture commenced in 1948, lifts 60 tons in 8 hrs. The sorter is a machine which grades 5 tons of potatoes per hr. in 3 sizes.

**Threshing Machinery.**—The thresher

separates and cleans the grain weighs it, and delivers it into sacks at the same time delivering the cut straw tied into bundles. The whole process takes about 30 secs.

**Harvester thresher and Combine Baler** — The spread of mechanised farming has led to the introduction of a variety of labour saving machines notably those which combine the operations of 2 or more existing ones. Amongst these is the harvester thresher which combines the 2 operations of cutting and threshing grain. Essentially it consists of the appropriate parts of a binder and a threshing

progress in agriculture must be based. It is allied with experimental work which aims at directly improving farm methods. A.R. began with the experiments carried out in 1834 by Joseph Boussingault (qv) on his farm in Alsace. Since then institutes for research in agriculture have sprung up all over the world and it is now the recognised duty of a state to develop its agr. resources. As regards Great Britain a development fund was started in 1901 with a capital of £2,000,000 and State grants have been made increasingly to all research stations. A.R. is organised throughout the Brit.



John Lartien

#### THE COMBINE HARVESTER

The man seen standing is tying off filled bags of threshed grain

machine mounted on a common chassis. Another machine of this type is the combine baler, which picks up hay from wind rows in the field and packs it into bales.

**Manure Distributors** of various types admit of either broadcasting or drilling, and are able to deal with all kinds of fertilisers. The dung spreader is simply attached to the end of a wagon, and distributes the manure fan wise over a large stretch of ground.

**Food preparing Machines** save labour in preparing food for the various animals. Such are gist mills, chaff cutters, root pulpers, machines for slicing and shodding roots, breaking oilcake, etc.

See also under **DAIRYING** and **CHEESE**. See also H. J. Hine *Tractors on the Farm*, 1942, National Federation of Gas & Coke Associations, *Combine Harvesting and Grain Drying*, 1914 (Culpin Farm Machinery), 1946.

Agricultural Research establishes the fundamental natural principles on which

Empire and in 1927 an Imperial Research Conference was called with the object of providing a stimulus for the development and co-ordination of A.R. overseas in the interest of Empire trade and production. In Finland, Wales and Scotland the research institutes are controlled by independent bodies usually attached to univs., but dependent on the State for funds. In N. Ireland the work is entirely administered by the Ministry of Agriculture for N. Ireland. The A.R. Council, created in 1931 as part of the organisation for the scientific supervision of gov. aided research in all spheres, advises the development commissioners and the agric. depts. upon the application of moneys voted by Parliament for the furtherance of A.R., besides itself promoting research with the aid of funds from Parliament or from any other source.

The problem of agric. science may be classified under the following heads

**Soil.**—The Rothamsted Experimental Station, founded by Sir T. B. Lawes (*q.v.*), is famous for its research into the chem. of the soil.

**Plant-breeding.**—The Cambridge Plant-breeding Institute has produced 2 new forms of wheat—'Yeoman II,' superior for milling and baking, and 'Cambridge Broomick,' a stiff-strawed wheat for intensive cultivation. (Grass-land farming is studied at the Welsh Station, Aberystwyth, and the Scottish Station, Corstorphine. The fundamental principles of plant-breeding are investigated at the John Innes Horticultural Institute, Merton, Surrey.)

**Plant Physiology,** referring to the inner processes of growth, is studied at the Research Institute in Plant Physiology, London. Field experiments, allied to this work, with hay, barley, and wheat, are conducted at Rothamsted, with oats at Linscliden, Dumfries, and with clover hay at Harper Adams College, Newport, Salop.

**Fruit Research** is centred at Long Ashton, Somerset, at E. Malling, Kent—famous for research in layered root stocks—and at Cambridge, in connection with the fruit-growing area there.

**Plant Diseases** have been combated by practical research throughout the United Kingdom. Pests which affect glasshouse crops are investigated at Cheshunt Research Station.

**Stock-feeding** is, in England, the concern of the Animal Nutrition Institute at Cambridge Univ., and, in Scotland, of the Rowett Institute at Aberdeen Univ. As part of a pig-research scheme, feeding trials are conducted at Harper Adams College.

**Animal-breeding** is the subject of extensive research at the Physiological Institute, Cambridge, while the work on sheep-breeding at the Research Station, Edinburgh, is noteworthy.

**Dairying.**—Clean milk is an outcome of the activities of the National Institute for Research in Dairying, estab. at Reading in 1912. In 1920 a farm of 340 ac. and a dairy herd were acquired. The Dairy School at Kilmarnock exists primarily for education, but the use of bacterial cultures as a starter in cheese-making was first examined there.

**Animal Diseases.**—The Institute of Animal Pathology is at Cambridge, and the scope of research at the Royal Veterinary College, London, has been enlarged. The London School of Hygiene and Tropical Medicine, which studies animal and plant parasites, is equipped with field laboratories at St. Albans. In Scotland the Animal Diseases Research Association, transferred to Moredun, near Edinburgh, now works in conjunction with Edinburgh Univ. In N. Ireland provision for the study of animal diseases is made at the State laboratories at Stormont, Belfast. In Mar. 1924 a committee of pathologists was appointed to investigate foot-and-mouth disease. Research was conducted at the Gov. laboratories, New Haw, Weybridge, and at the Foot-and-Mouth Disease Experimental Station at

Pirbright. See V. E. Wilkins, *Research and the Land*, 1926; also *The Report of the Imperial Agricultural Research Conference*, 1927.

See also AGRICULTURAL BUREAU, IMPERIAL.

**Agriculture** (Lat. *ager*, field, *colere*, to cultivate) in the strict sense is the art concerned with tillage of the ground and the raising of crops, but is now generally understood to include every branch of farm practice, upon which all the natural sciences have more or less bearing, as epigrammatically summed up in the motto of the Royal Agricultural Society, 'Science with Practice.' He who would pursue A., or the allied industries of horticulture and forestry, with the maximum of success should not only realise the possibilities presented by advances in science and be conversant with every practical detail, but must also know how best to adapt his methods of procedure to local conditions.

**History.**—In W. Europe, as elsewhere, a great stride was made in civilisation when prehistoric man, during the polished stone or Neolithic age, ceased to be a mere wandering hunter and adopted a more settled life, resulting from his discovery of the possibilities of tillage of the ground and domestication of animals. The Neolithic farmer lived in vil. communities, his habitations being sometimes in the form of lake dwellings; his domesticated animals included the dog, horse, ox, sheep, goat, and pig; his crops included wheat, barley, and millet; and he practised the arts of spinning, weaving, and pottery-making. Such primitive prehistoric beginnings, improved by numerous successive stages, ultimately led to the evolution of the vil. system prevalent in England during Saxon times and for long afterwards. The houses of the villagers clustered together in the centre of an area partly consisting of pasture, but to a larger extent of arable land, divided into 3 fields, one under grain, a second under peas, beans, or grain, and the third fallow, i.e. without a crop, and in a state of preparation for receiving one in its turn. The introduction of potatoes, red clover, and turnips in the seventeenth century marked a considerable advance, and the next century was epoch-making in sev. ways. During its latter part the most important name is that of Jethro Tull, who demonstrated the advantage of *thorough cultivation of the soil*, and initiated the practice of *drilling* as against broadcasting seed, thus causing the crop-plants to grow in rows, the intervals between which can be stirred and cleaned by horse-hoeing. This led to the abolition—in most cases—of bare fallow, largely a device for thorough cleaning of land, and found a place for turnips and other root-crops. Hence the replacement of the 'three-field' system of the vil. community by the *Norfolk or four-course rotation*, initiated by Charles, second Viscount Townshend ('Turnip Townshend'). The cultivation of turnips and other root-crops on a large scale rendered possible the

winter feeding of cattle, and thus did away with the extensive use of salted meat during that season, a practice very detrimental to the health of the community. The eighteenth century witnessed great improvements in farm animals, due to the pioneer work of Robert Bakewell, who effected great advances in the quality of horned stock and sheep, largely by means of in-breeding. Among other benefits derived therefrom was great reduction in the age at which bullocks and wethers were ready for the butcher. In the earlier half of the nineteenth century we find *improved methods of draining land*, largely due to Elkington and Smith. Associated with these advances came marked improvements in tillage implements, and much enclosure of land as a result of the 'new husbandry' rendered possible by Tull's work. During the nineteenth century many advances took place in continuation of those just mentioned, and sev. new lines of progress were initiated, but the years 1815-40 were marked by disastrous agric. depression. The following dates are significant as marking the beginnings of various forms of agric. activity which have had far-reaching results; Bath and W. of England Agric. Society, 1777; Highland and Agric. Society of Scotland, 1784; Chair of A. and Rural Economy in Edinburgh Univ., 1790; Board of A., 1793; Smithfield Club, 1798; Royal Agric. Society of England, 1838; Rothamsted Experimental Station, 1843; Royal Agric. College, Cirencester, 1845. The nineteenth century witnessed the improvement of crops by means of *artificial manures*, dung and various forms of rubbish being the only kinds of fertiliser previously employed. Bones came first, though Sir Humphry Davy (lecturing 1802-12) also mentions phosphate of lime, sulphate of potash, and salts of magnesia. Nitrate of soda and guano were first imported 1830; superphosphate resulted from the researches of Lawes and Liebig, and began to be used on a large scale in the early forties; potash manures, prepared from the Stassfurt deposits, came later, and were followed by the discovery of basic slag. The *improvement of wheat by crossing* was commenced by Knight towards the end of the eighteenth century, and taken up by Maund much later; while Shirreff began to improve cereals by *selection* in 1819, a variation of his method being subsequently practised by Hallett (1857). Practically all kinds of crop-plants were improved on similar lines. During the nineteenth century also the necessity of using *clean seed*—first realised in Denmark—was increasingly recognised. The implements of tillage were still further improved, *reaping machines* and other contrivances for harvesting and after-treatment of crops were evolved in profusion, and different forms of *power* employed for working many of them. During the century great advances were also made in the knowledge and treatment of *plant diseases*, especially those due to the attacks of parasitic organisms. The

rapid improvement in biological appliances (especially microscopes) and technique not only placed the study of *injurious fungi* on a scientific footing, but also enabled the science of *bacteriology* to be created, largely as a result of the pioneer work of Pasteur. Bacteria were found not only to be agents of infectious disease, but also to play an important part in the chemical changes which go on in the soil, in dairy processes, and so forth. Equally valuable progress was also made in respect of *live-stock*. Many breeds were improved or estab. on Bakewell's lines, and the formation of numerous breed-societies in the latter part of the century secured the maintenance of high standards. The biological advances above mentioned enabled great improvement in the treatment of *animal diseases*, while at the same time the importance of *farm hygiene* came to be realised. *Artificial foods*, of which linseed cake was the first (1795), gradually came to play an important part in winter feeding and the promotion of early maturity. Gilbert in England and von Wolff in Germany, with many others, placed the feeding of stock on a scientific foundation. (*See CATTLE.*—*Scientific Methods of finding Feeding Standards.*) The invention of the *cream separator* proved of great importance in the improvement of dairy work. A. has continued to make considerable advances during the present century on all the lines indicated. The application of *Mendelian principles* to the breeding of plants and animals, especially the former, is leading to considerable results, as in the production of *rust-resisting wheats* by Biffen, improved cereals, etc., at Svulof, and so forth. Further progress in research, horse-breeding, and education are assured by the establishment of a *Development Fund*.

*The Soil.*—Crops derive most of their food from the soil, in the form of a very dilute solution of mineral substances, though the air provides them with carbonic acid gas and they breathe in its oxygen, while the nitrogen of the atmosphere is fixed for their use by certain soil bacteria and—in the case of leguminous plants—by other forms of the kind living in swellings or nodules on the roots. As, too, animals depend directly or indirectly on plants as their source of food, it is obvious that a thorough knowledge of the soil is essential to the intelligent practice of A. By whatever agencies different soils may have been formed, a certain amount of organic substance, *humus*, due to the decay of organisms, must be present in addition to the mineral particles formed by disintegration in order to secure fertility. (*Green manuring*, i.e. the ploughing in of a rapidly growing green crop, is one way of supplying such material. The *physical properties of soils* largely determine the rate and amount of growth of crops, and therefore require notice. A particular soil consists of particles of varying size, with narrow interstices between them, collectively forming the *pore space*. Each particle is

closely surrounded by a film of water, and it is these films which are utilised as *plant food*. The free water in the interstices is more or less removed by drainage, and if this goes on too slowly a free circulation of air must be promoted by artificial means, especially when a large proportion of clay is present. As the water in the soil is used up, fresh supplies rise from below by capillary action, which also replaces the loss by surface evaporation. While drainage gets rid of superfluous moisture, it is often necessary in a hot climate or season, more particularly in the case of sandy soils, to *conserve the moisture* present. This is effected by constant stirring of the surface, by hoeing and otherwise, evaporation being thus checked. In some cases *mulches* of decaying vegetation, or other substances more or less impervious to moisture, answer the same purpose. Such conservation is practised to a very large degree in 'dry' farming, a comparatively new practice in arid regions, such as parts of the U.S.A. The *temperature* of the soil, partly determined by colour and aspect, is also of importance, more especially because seeds require a certain amount of heat in order to germinate, so that whether a given crop is early or late very largely depends upon this factor. The *classification of soils* is based on their *chemical composition*, and depends upon the proportions they contain of sand (mainly silica), clay (impure silicate of alumina), carbonate of lime, and humus. Sand is warm, and easy to drain and till, but apt to become too dry, and but little retentive of plant food. Clay is cold, retentive of moisture and plant food, hard to drain, and difficult to work. A proportion of *carbonate of lime* is important, because it furnishes one kind of plant food, helps to break down organic matter, and improves the texture of clay. Humus supplies nitrogenous matter, and its presence is associated with important bacteria, some of which effect *nitrification* of organic substances—with production of *nitrates* valuable as plant food—while others are *denitrifying* agents and lead to loss of nitrogen. Most soils are of *mixed* character, *loams* being primarily a mixture of sand and clay, while *marls* are made of clay and calcareous matter. Medium loams, with a certain admixture of calcareous material and humus, are the best soils for general purposes.

*Improvement of soils* is effected in a great variety of ways, the aim being to impart such desirable physical and chemical characteristics as are naturally lacking or deficient. *Artificial drainage* of heavy soils, for example, removes superfluous water and promotes the circulation of air, and in such case *winter ploughing* exposes the clods to the disintegrating action of frost. The lighter soils, on the other hand, require *consolidation*, as by the treading of sheep folded upon them, while hoeing and similar acts of tillage help to conserve the moisture which drains away too readily. It may also be said in general that *tillage*, by means of ploughs, cultivators, harrows,

and so forth, artificially imitates disintegration by natural agents, and produces a seed-bed of fine texture (tilth) made up of innumerable particles to which cling the films of moisture that serve as plant food. The application of suitable *manures*, though in some cases of physical importance, is mainly directed to supplying forms of plant food present in insufficient amount, such as—more particularly—lime, nitrogen, phosphorus, and potash. A distinction may here be drawn between natural and artificial manures. Among the former may be mentioned quicklime and ground limestone, of obvious importance in the case of soils deficient in calcareous matter, and also of great value in improving the texture of clays, and mellowing sour soils too rich in humus by disintegrating the organic matter and neutralising the acids. To the same category belongs *furnyard manure*, or *dung*, which not only improves the texture of soil, but is also a *complete* fertiliser, since it returns to the soil all the essential constituents of plant-food. The excreta of grazing stock have a similar chemical effect. *Artificial manures* may contain one or more than one kind of plant food. Among the latter sort may be particularly mentioned *Peruvian guano*, derived from the excrement of sea birds, and containing compounds of nitrogen and phosphorus. *Phosphatic manures* include various *bone* preparations, and *superphosphates* prepared by treatment with dilute sulphuric acid of finely ground bones or mineral phosphates. The most important deposits of the latter are in Florida and N. Africa. Accumulations of guano from which the nitrogen has been practically washed out ('crust' guanos) are also very valuable as a source of phosphorus. *Basic slag*, or *Thomas phosphate*, produced as a by-product in iron-smelting, is another important phosphatic manure, giving particularly good results when reduced to a very fine state of division. The chief *nitrogenous manures* are *nitrate of soda*, of which large deposits exist in Peru and Chile, *sulphate of ammonia*, a waste product from gas-works, and various *refuse substances* such as soot, shoddy, dried blood, horns and hoofs, damaged feeding-cakes, and so forth. It has also been found possible, by electrical means, to cause the free nitrogen of the air to enter into combination, with production of *calcium nitride* and *calcium cyanamide*. The leading *potash manures* are *chloride of potash*, *sulphate of potash*, and *kainit*, which consists of potassium sulphate and chloride together with compounds of sodium and magnesium. The *manurial treatment of crops* varies with their food requirements, which are by no means uniform in different plants; but in any case the aim is to add what is deficient in the soil as cheaply as possible. The method at time of application are naturally of importance. The *value of manures* is best determined on the *unit system*, and the *units* of nitrogen, phosphate of lime, and potash are taken at 1 per cent of a ton.

*Crops* in the widest sense are divisible into what is broadly termed 'grass,' and plants which are grown upon arable land. *Temporary grassland* bears grass, with clover and some other plants, and after a time is reconverted into arable. *Permanent grassland* includes *pastures*, which are grazed but not mown, and *meadows*, which are mown for hay either every year or at less frequent intervals. The botanical composition varies with the kind of grass-land, and it is obvious that the manurial treatment must also vary, especially when it is remembered that grazing stock effect a certain amount of natural manuring; while meadows do not benefit in this way to the same extent, and the hay crop is a continuous drain upon the resources of the soil without any manurial return. The *seed mixtures* employed when land is laid down to grass are different according as temporary or permanent grassland is the object in view, as also in relation to the kind of soil. In the case of *temporary grass*, rapid growth is of most importance, and perennial species need only be added should it be intended to maintain the area under grass for some years. A 1-year lea may even consist of broad red clover only, a plant which botanically is not a grass at all. The seed-mixtures employed for the production of *permanent grass* chiefly consist of grasses and various leguminous plants, to which are sometimes added composites (yarrow), rosaceous species (burnet), and umbellifers (sheep's parsley). Land, before being laid down to grass, should be very thoroughly cleaned, autumn ploughing being followed in spring by harrowing and rolling, by which means a finely divided seed bed is obtained. It is a common practice to 'nurse' the young grass by sowing it with a corn crop, and sowing is followed by light harrowing and rolling. By mowing the first year, and giving either a complete dressing of dung or a suitable mixture of artificials, the incipient permanent grass will be given a fair start. In subsequent treatment chain-harrowing is of importance for pulling out moss and some injurious grasses, while the manuring varies according to the local character of the soil. Grazed land, except perhaps for dairy purposes, gives the best result when horses, cattle, and sheep are maintained in suitable proportions, and turned out at suitable times. The processes involved in *haymaking* have as their object the conversion of grasses and associated plants into dry food. Although, unfortunately, largely dependent on weather conditions, there is here much room for judgment, and the time element has been under much better control since the introduction of various machines. Cutting should take place when the grasses are in flower, and before the formation of seeds has effected too great a drain on the nutrient substances contained in the stems and leaves. *Ensilage* is a method of converting herbage into succulent fodder, and, as the necessity for drying is avoided, can go on independent of weather. The crop is collected and

consolidated either in a simple heap or *silo stack*, or in a *silo*, which may be simply a hole in the ground, or a specially constructed receptacle. Fermentation takes place by bacterial action, and the resulting *silage* is sour (containing a large proportion of organic acids) when the temp. remains below 120° F., and sweet (with an aromatic odour) at higher temps.

It is generally recognised that the best results are obtained with crops on arable land when the same kind of plant is not grown continuously in any particular field, but a regular change or *rotation of crops* is practised. The advantages consist in the production of healthier plants, less liable to the attacks of pests, a saving in manure (since different crops vary in their requirements), provision for the needs of stock, and economy in labour. In this way, too, the plant food contained at different depths in the soil is drawn upon, for the roots of some culture plants feed in the surface layers, while others penetrate more deeply. The most typical arrangement is the *four-course* or *Norfolk rotation*—an autumn-sown cereal, roots, a spring-sown cereal, a leguminous crop. The autumn-sown cereal is commonly *wheat*, though *oats* may take its place, and its needs as regards nitrogen have been catered for by the preceding nitrogenous crop. The *straw* produced is valuable for fodder, litter, and thatching, and also provides work for the horses. The following *root crop*, replacing the old bare fallow, may consist of turnips, swedes, mangolds, carrots, or parsnips, where the nutritious part is really the root, and other plants which serve the same purpose, e.g. potatoes, of which the tubers are really thickened underground branches. The root crop is important because it gives an opportunity of thoroughly cleaning the land, and provides a large amount of fodder for stock, the constituents of which, essential for plant food, are largely returned in the form of dung. The *spring-sown cereal crop* consists either of barley or oats, the one chosen depending upon local conditions. The fourth, or *leguminous crop*, is of a restorative nature, especially as regards nitrogen. It is commonly spoken of as 'seeds,' because it may consist of a mixture including grasses, and is sown at about the same time as the preceding crop, so that it may have a chance of establishing itself. Clovers are an important element, but may be replaced by peas or beans. Deviations from the 4-course rotation are well known. They are arranged on the same principles, and may be regarded as adaptations to local conditions.

*Cereals*.—*Wheat* is best suited to soils with a considerable proportion of clay, and does best in a warm dry climate. As in cereals generally, the production of *straw* as well as *grain* must be borne in mind when selecting a variety for any particular locality. The choice of a suitable kind of wheat (and the same thing is true for any other cultivated plant) may to some extent be guided by

*variety tests*, where different sorts are grown side by side under similar conditions. The artificial manure giving best results for wheat (and other cereals) is nitrate of soda, to which basic slag or superphosphate may be added. Wheat should be harvested before it is quite ripe, and the average yield is about 30 bushels per ac., with 30-35 cwt. of straw. *Oats* may be grown on a great variety of soils, and do best in a cool damp climate. They must be harvested before becoming ripe, as the mature grains easily fall out. The average yield is 40-60 bushels per ac., with 30 cwt. or more of straw. *Barley*, most important for malting, is most successfully cultivated in the lighter calcareous soils, and in areas where the climate is dry. Owing to the necessity for uniform quality in the grain, the cultural operations have to be unusually thorough and careful. Average yield, 32-10 bushels per ac., with about 20 cwt. of straw. *Rye* is very little grown as a grain crop in Britain, but yields 21-32 bushels per ac., with 30-40 cwt. of straw. It is more often employed as a forage crop, which should be fed off early. It is harder than the other cereals, and thrives in soils and at low climatic conditions where these do badly. *Pulse crops*.—*Beans* do best on heavy soils, especially when these are of calcareous nature. Potash and phosphoric manures are of most importance, for, like all leguminous plants, beans enrich the soil in nitrogen. The yield is 30-40 bushels, with 25-30 cwt. of haulm. *Peas* differ from beans in being better suited for the lighter soils. The average yield is about the same. *Root crops*.—*Manure* is adopted to stiff soils and a dry climate. Very thorough preparation of the soil and after-cultivation are necessary. The average yield is 15-25 tons per ac. *Sugar beet* is closely allied to manure, and needs the same kind of treatment, but more labour is required, for the cultural operations have to be carried out with great attention to details. Attempts have now been made, with aid of a Gov. subsidy, for some years past to promote the growing of sugar beet on a large scale in Britain, and there appears to be no difficulty in raising the crop. *Swedes* are a valuable variety of the turnip, and belong to a different natural order (Cruciferae) from that (Chenopodiaceae) including mangel, so that it is not surprising to find their requirements somewhat different. They thrive best in the lighter soils and in a cold climate, provided plenty of moisture is available. The crop is shallow-rooted, and phosphatic manure is the one most necessary. Yield, 12-20 tons per ac. *Turnips* proper are comparable to swedes in most respects, but give on the average a larger yield, though not so valuable for feeding purposes. *Carrots*, a valuable crop for feeding horses and dairy stock, are only suited to light soils free from weeds, and require a fine seed bed. The cost of production is considerable. Average yield, 10-20 tons per ac. *Parsnips* are a similar crop, but, being tolerant of frost, can be left in the ground until wanted.

Average yield, 8-14 tons per ac. *Potatoes* are best suited to deep loose soils with a moderate amount of humus, but they can be successfully grown on almost any soil—except those of the heaviest kind—by adapting the treatment. They vary from early to late according to the time of maturity, and the production of the first kind is a very paying industry. The crop is usually propagated by 'sets,' which are either the entire tubers (thickened underground branches), or portions of the same including at least one 'eye' (bud). After a time a variety so cultivated begins to deteriorate, and fresh kinds are constantly being raised from seeds produced by crossing, though only a small proportion of these are of economic value. Manure treatment may be by dung alone, by a complete mixture of artificials, or— and best—by a mixture of the two. Potash is particularly essential. Average yield 6-10 tons per ac., or less in the case of early potatoes. *Kohl rabi*, *thousand-headed kale*, and *cabbages* are cruciferous forms which, though they do not produce thickened underground parts, may broadly be classified with the root crops, and receive much the same treatment. They are very healthy, resist frost and drought, are extremely nutritious, and are improved by transplanting, thus increasing the time for cleaning the land. Average yield per ac.: kohl rabi, 20-25 tons; thousand-headed kale and cabbage, 30-40 tons. *Cruciferous forage crops*.—Strictly speaking, a forage or fodder crop is one grown for the feeding value of its stems and leaves. The last 3 crops named are therefore sometimes included here. *Rape* is cultivated in much the same way as turnips, and *white mustard* is often grown as a summer catch crop, i.e. a crop which is not part of a regular rotation, but grown in an interval. It is obvious that rapidly growing plants are best suited for this purpose. The average yield per ac. of the two preceding crops is 10-15 tons. *Leguminous forage crops*.—*Lathes* or *fures* are grown to provide spring or summer fodder, and are a common catch crop. Potash manure is most essential, and some form of phosphate is usually added. When grown for seed the average yield is 25-30 bushels per ac., with about 25 cwt. of haulm. *Lucerne* and *sainfoin* are perennial deep-rooted species suited to loams of calcareous nature. They may either be used for forage or converted into hay. *Scotch* or *Italian clover*, commonly known as *trifolium*, is a catch crop sown for the production of forage in the spring and early summer. *Clivers* and '*seeds*,' i.e. various clovers plus grasses, constitute an important course in rotation, sown with a cereal, or somewhat later, and coming into use a year afterwards. *Weeds* are plants belonging to various natural orders which are harmful in the main, using up nutrient matters to the detriment of crops, and helping fungoid and insect pests to tide over unfavourable seasons. It has been shown experimentally that they may reduce the yield by as much as

one-half. They are best kept down by using clean seed and keeping land in a high state of cultivation, to which a locally suitable rotation conduces in no small degree. The use of the hoo on arable land, constant cutting of thistles on grassland, and spraying charlock with a per cent solution of copper sulphate, may be mentioned as typical examples of remedial measures.

**Farm Stock.**—These chiefly consist of horses, cattle, sheep, goats, and swine. Horses are divided into *light breeds*, including thoroughbreds, hunters, hackneys, ponies, Cleverlands, and coaching horses; and *heavy breeds*, to which belong shires, Clydesdales, and Suffolks. The heavy breeds are of agric. value, because they do so much work on the land, and the question of farm profit or loss largely hinges upon the intelligent use of horse labour. Shires, Clydesdales, and Suffolks are capable of performing the work required of them, the last-named breed being the most local.

**Cattle.**—Nearly a score of breeds are officially recognised in Britain, some of which are valued as beef-producers, others for milk, and still others for both purposes. Among the first kind may be mentioned Aberdeen—Angus (black), Galloway (black), Hereford (red), Highland (black), N. Devon (red), and Sussex (red). *Dairy breeds* are Ayrshire (various), Jersey (fawn), Guernsey (yellowish), and Longhorn (various). *Dual-purpose cattle* are Dexter (black), Kerry (black), Red Poll (red), Shorthorn (and Lincoln Red) (various), S. Devon (yellowish), and Welsh (black). (The predominant colours are given in parentheses.) The *polled* or hornless breeds are Aberdeen-Angus, Galloway, and Red Poll. *Longhorns* are particularly interesting because they were greatly improved by the pioneer breeding work of Bakewell, but their horns were against them, and they were superseded by the Shorthorns. The latter, now more widely favoured than any other breed, first rose into prominence in the latter part of the eighteenth century, owing to the production of a famous Durham strain by the brothers Colling. Other notable strains were subsequently established in Yorkshire by Booth and Bates, and in Aberdeenshire by the brothers Cruickshank. See CATTLE. The feeding and management of cattle are difficult arts, affording opportunity for the display of much skill and intelligence. The modern farmer is aware that the requirements of farm hygiene cannot be safely neglected, and the choice of artificial feeding-stuffs is now so large that the difficult question of *mixed rations* is receiving increasing attention. *Dairying* has reached a high pitch of perfection, especially in Denmark and other foreign countries—Canada, New Zealand, and Australia—the branch least successful financially—in Britain—being butter production. Sev. important factors have conduced to the modern development of the industry, and these include improvement of stock, rational feeding and management, and the keeping of milk

records, so that the worth of individual cows may be accurately known. The cream separator and other machines, and the introduction of power in large dairies, have reduced the labour bill and enabled some of the work to be effected in an improved manner. Even more important results have followed from the discovery that dairy processes are largely dependent upon the action of *bacteria*, some of which are beneficial and others harmful. Strict *cleanliness* in all stages is the best method of combating the latter. By the employment of *artificial cultures* of cream-ripening (lactic acid) bacteria it is possible to ensure butter of uniform quality, and this point has told strongly in favour of the Dan. and Ger. products, which have competed so successfully against us in our home markets. The standard of stock, for both milk and beef, is being improved by artificial insemination by pedigree bulls: this service is under the control of the Milk Marketing Board. See DAIRY; DAIRY FARMING.

Sheep are conveniently grouped into: 1. *Longwool breeds*—Cotswold, Devon Longwool, Kentish or Romney Marsh, Leicester and Border Leicester, Lincoln, Roscommon, S. Devon, and Wensleydale. 2. *Shortwool breeds*—Clun Forest, Dorset Horn, Hampshire Down, Oxford Down, Ryeland, Southdown, Shropshire, and Suffolk. 3. *Mountain breeds*—Black-face Mountain, Cheviot, Exmoor, Herdwick, Limestone, and Lonk. Among these the last group and the Dorsets are horned, and the remainder polled. The *Leicester* is the oldest breed of pure kind, which was greatly improved by Bakewell, and has since been used very largely for enhancing the value of many other types. Border Leicesters are a branch of the same breed. *Lincolns* are pre-eminent for production of wool, *Suffolks* and *Southdowns* are notable for their mutton—though the flavour of that from mt. breeds is greatly esteemed—while *Leicesters*, *Shropshires*, and *Oxford Downs* are among the leading dual-purpose breeds. Sheep are not only of direct value as producers of mutton and wool, but also as improvers of the land. When fed on light arable they greatly assist in consolidation, to say nothing of the manurial improvement effected, while they graze so closely that they can find abundant food on pastures which have already supported other classes of stock. The *mountain breeds* are of particular importance in utilising mountain tracts otherwise useless for agric. purposes.

**Pigs** are divided into Whites, Blacks, Berkshire (black with white points), Tamworth (golden-red), and Lincoln Curly-coated. As users of waste they play an important part in A., and are invaluable to the cottager and the small holder. Owing to their comparatively small stomachs, they require concentrated food, given at frequent intervals. Some of the best results are obtained from cross-bred animals.

**Fungoid Pests and Bacteria.**—The lower forms of plant life known as *fungi*,



and the still simpler microscopic *bacteria*, are unable to subsist on the simple compounds sufficing for ordinary green plants, the living substance of which, aided by the characteristic green pigment *chlorophyll*, can utilise the energy of sunlight for building up complex substances from water, carbonic acid gas, and certain mineral matters. Fungi and bacteria, in fact, somewhat resemble animals in their way of feeding, and are either *saprophytes* (e.g. mushrooms), depending on dead organisms or the products of their decay, or else *parasites*, which prey upon living ones. Many of the latter attack cultivated plants and domesticated animals, and are therefore very detrimental to A. They propagate by means of dust-like *spores*, which are readily disseminated by the wind. *rusts* are able to inflict losses of the most serious kind upon cereals and grasses, and the establishment of resistant varieties appears to be the most promising method of combating them. *Smuts* are fungi which prevent the formation of grains, these being replaced by powdery black spores. *Oat smut* (*Ustilago avena*) may be checked by 'pickling' the seed corn in dilute solutions of copper sulphate or formalin. *Hunt* (*Tilletia caries*) is nearly related to the preceding, but is distinguished by its greasy nature and unpleasant fishy smell. *Ergot* (*Claviceps purpurea*) attacks rye and meadow grasses, causing the grains to be replaced by hard spur-like bodies. These are particularly objectionable because they cause abortion in cows and ewes. *Potato disease* (*Phytophthora infestans*) attacks all parts of the potato plant, and is a pest of the most serious kind. Spraying with Bordeaux mixture (dilute solution of copper sulphate and quicklime) is the best method of treatment, especially as a preventive measure, for it stimulates healthy and vigorous growth. *Black scab or wart disease* (*Chrysophyctis endobiotica*) is due to a fungus of doubtful affinities, and is so serious as to be notifiable. Destruction of infected tubers and thorough disinfection of the soil are necessary, and the planting of a different crop for a time is highly advisable.

Speaking generally, fungoid pests of plants are best combated by high farming and rational rotations, by which vigorous and healthy plants are produced, able to resist the attacks of parasitic fungi, especially in the critical early stages of growth. A knowledge of the life histories of injurious forms often indicates the methods which can most advantageously be employed in dealing with them.

**Animal Pests.**—Among *mammals* the most pernicious forms are probably rats, mice, and voles, which all belong to the order *Rodentia* (gnawers). Rats and house mice are omnivorous, while field mice, harvest mice, and voles are vegetarian. All are exceedingly prolific, and when favoured by local circumstances, some of them—especially *field voles* (*Microtus agrestis*)—may make their appearance in vast numbers and become veritable plagues. *Rats* are objectionable

in another way, for they help to disseminate the disease known as *trichinosis*, due to minute thread-worms, while some of the fleas which infest them are known to spread the germs causing *oriental plague*. In coping with injurious rodents their natural enemies—such as owls and weasels—should not be ruthlessly hunted down as 'vermin.' Ferrets, traps, poisons, and forms of 'virus' (bacterial cultures) are all employed, with varying success. Only a systematic campaign, supported by legislation, is likely to achieve anything like full success. *Hares* and *rabbits*, which are also rodents, may do much damage to crops, and the ravages of the latter in Australia are matters of common knowledge. One large landowner in that continent expends £1000 per annum on rabbit-catching.

*Wild birds* have a varied relation to A. Some are wholly or mainly beneficial, others are undoubtedly harmful in the main. Nor must it be forgotten that species are liable to change their habits. *Starlings*, for example, at one time predominatingly beneficial, have begun to attack fruit in some districts. It may be remarked in passing that the interests of the farmer and fruit-grower are not identical in this direction, for birds which may be useful to the former are pests to the latter. Among birds entirely or mainly *beneficial* are game birds, birds of prey (except the sparrow-hawk), owls, swallows, martins, swifts, and cuckoos. More or less *harmful* are the sparrow-hawk, pigeons and doves, hooded crow, bullfinch, greenfinch, hawfinch, house sparrow, blackcap, and other warblers. *Molluscs*, especially field slugs, are able to do considerable damage. Repeated applications of quicklime are here to be recommended. *Insects*, owing to their extraordinary variety, great powers of rapid propagation, and powers of flight, are among the most serious foes with which the farmer has to contend. Many of them have a complicated life history, hatching out as a voracious *larva* (e.g. caterpillars of butterflies and moths), which passes into a *pupa* or resting stage, capable of remaining dormant through the unfavourable season of the year, and giving rise in spring to the adult or *imago*. *Beetles* constitute an exceptionally large order, including many pests. The *cockchafer*, for example, lives below the surface as a larva (grub), feeding upon roots and underground stems. When adult it devours foliage. *Wireworms*, the subterranean larvae of *click-beetles*, are especially notorious, and are best dealt with by thorough cultivation and the use of gas-lime. *Turnip 'fly'* is in reality a small beetle, and various long-snouted *weevils* attack the roots, flowers, or seeds of sev. crops. The *Colorado beetle*, whose grubs and adults both eat potato leaves, is a dangerous visitor from abroad. By the exercise of drastic measures this pest has so far been prevented from establishing itself. Some beetles, however, are useful, such as the little *ladybirds*, the larvae of which devour large numbers of

plant lice (aphides). The order (Hymenoptera) including bees and wasps embraces the harmful *sawflies*, which in the larval stage infest turnips and various fruits. But we must not forget the benefits conferred by *bees*, important fertilising agents, while the hive-bee yields honey and wax. The *ichneumon flies* also do much service by laying their eggs in the eggs or larvæ of many injurious forms, thus bringing about their destruction. *Butterflies* and *moths* (Lepidoptera) are almost always injurious, for their larvæ (caterpillars) are among the most serious enemies of crops. The extensive order of *bugs* (Homiptera) includes many injurious forms, of which those variously termed *green fly*, *plant lice*, or *aphides* are perhaps the most notorious. They attack cabbages, turnips, beans, potatoes, hops, cereals, and other crops, and are probably the most prolific insects. The *two-winged flies* (Diptera) are in many cases injurious to both crops and stock. Of those injurious to crops, the *crane-flies* or *daddy-longlegs*, with their underground larvæ, are most universally known, while the *Hessian fly*, *corn-midge*, and *fruit-fly* attack cereals. Probably the most injurious member of the order infesting stock is the *ox-bot* or *warble-fly*, of which the larvæ live in the skin of cattle, damaging the hide, and reducing the value of the meat ('licked beef'). *Preventive measures*, directed against insect pests, include the high farming and rational rotations also useful in connexion with fungoid infestations. The grease-banding and tarring of fruit-trees are means of arresting the ascent of wingless female moths (e.g. winter moth) from the ground, where the pupæ are found. *Spraying* and *dusting* are important remedies, the poisons used varying according as the pests possess biting (e.g. beetles) or sucking (e.g. plant lice) mouth-parts. The aim in the former case is to poison the food, and in the latter to block up the breathing pores of the insect or otherwise destroy it by contact. *Spiders*, destroying as they do many injurious insects, are decidedly beneficial. *Mange*, *scab*, and *itch* are examples of animal diseases due to the presence of these pests. Mites infesting plants are combated in much the same way as insects. The notifiable disease called *sheep scab* is caused by a parasitic mite (*Psoroptes communis*), and is dealt with by means of various dips. *Ticks* are large mites which suck the blood of domesticated animals, and are not only directly injurious in this way, but may also introduce the germs of diseases (Texas fever of horned stock, and probably louping-ill in sheep). In some parts of the world, e.g. E. Africa, they are exceedingly detrimental and often fatal to stock, but regular treatment with suitable dips seems likely greatly to further the interests of A. in such regions. The farmer has to contend with a host of parasitic worms, some of which are able to inflict serious losses. The notorious *liver fluke* (*Fasciola hepatica*) is sometimes found in large numbers in the liver and

hepatic ducts of sheep, causing 'liver rot.' The parasite has a very complicated life-history, and part of its existence is spent in a small water snail (*Lymnaea truncatula*) often found on damp low-lying land liable to be flooded. The best precautionary measures consist in thorough drainage and proper control of the drinking water. *Tapeworms* (*Taenia*), when adult, generally live within the small intestine of man or domesticated animals ('final hosts'), absorbing the digested food found therein. Two tapeworms highly injurious to stock live when adult in the intestine of the dog. The bladderworm stage of one (*T. caninus*) is found in the form of large cysts on the surface of the sheep's brain, and is responsible for the disease variously known as *staggers*, *gid*, or *sturdy*. The huge compound cysts of the other (*T. echinococcus*) are found in the liver or other abdominal organs of man and various hoofed mammals. It is clear that an accurate knowledge of the life-histories of parasites such as those enumerated is essential for coping with them successfully. Some of the lowly microscopic creatures known as *Animalcules* (Protozoa) are the cause of *malarial diseases*, part of the life history being passed within the bodies of *dapple-winged mosquitoes* (*Anopheles*), the bites of which cause infection of the blood of human beings. As the larvæ of mosquitoes live in stagnant water, it has been found possible, in some places, to get rid of malarial diseases by drainage, or by pouring petrolum into ponds infested by the larvæ. A number of particularly deadly blood diseases of human beings and stock are caused by Protozoa, which in a certain stage of their existence are known as *trypanosomes*. The chief agents of infection are flies and ticks. In tropical Africa the bites of certain *tsetse flies* (*Glossina*) lead to *nagana* or *fly disease* of horse and ox, and *sleeping sickness* of human beings. Most likely a *gad-fly* introduces the germs of *surra* into Indian ruminants. *Texas fever* of cattle in N. America, and probably *louping-ill* of sheep in Britain, are communicated by ticks.

From what has been said regarding pests of all sorts it will be gathered that there is almost unlimited scope for scientific research, and upon this almost entirely depends the agric. development of tropical regions now rendered unhealthy by malarial diseases, or uninhabitable by serious parasitic maladies such as sleeping sickness.

*A. during and since the First World War.*—During the First World War several temporary Acts were passed with a view to increasing the amount of home-grown corn in the country. These included the Small-Holdings Colonies Act (1916), which provided for the purchase of land by the State for experimental small-holding colonies; the Corn Production Act (1917), which made provision for payments to growers of corn where the average price of wheat or oats was less than the minimum, and for a minimum rate for agric. wages, and gave power

to the Board of A. to enforce proper cultivation; and the Agric. Land Sales (Restriction of Notices to Quit) Act 1919. The weakness of the United Kingdom, however, in this its oldest industry, was emphasised by the war. Notwithstanding that the command of the seas remained with the Brit. Navy in so far as the unrestricted Ger. U-boat warfare failed to account for more than a certain percentage of mercantile shipping, the shortage was much more acute than it would have been had A. been in a flourishing condition immediately before the war. In spite of various Acts, such as those designed to encourage town-dwellers to go back to the land, the state of A. in the United Kingdom grew steadily worse. A period of depression began in 1922. Corn markets were adverse, with the result that the acreage of ploughland gradually diminished. By 1927 the area of ploughland in England and Wales had declined by about 700,000 ac. since the opening year of the war, and in Scotland by some 20,000 ac. The state of A. in Great Britain, in face of adverse economic forces, became critical in 1927, and chief hope was reposed in agric. credits. By the Agricultural Credits Act, 1923, the Ministry of A. is empowered 'to organise agric. credit societies or, in other words, approved societies registered under the Industrial and Provident Societies Act, 1893, having for their object the making of advances to members for approved agric. purposes. The Agricultural Credits Act, 1928, provides for loans secured on farming stock or other assets, through a company formed out of public funds. Provision was made by the Agricultural Development Act, 1939, for increasing the resources of this company.

High costs and low prices in the first decade after the war spelt losses and a generally uncertain outlook for Brit. A., which led, in 1930, to persistent agitation for Gov. intervention. The large stocks of grain produced in Canada, the U.S.A., and Argentina had an increasingly detrimental effect on the prospects of A. in Great Britain, and in some quarters a tentative suggestion was made for reciprocal arrangements with the Dominions, whereby foreign wheat should be subject to a tariff for the benefit of both Dominion and homegrown grain. Other critics as emphatically advanced the theory that better marketing arrangements were the real panacea, and in any event a far more scientific remedy than the much-boomed policy of 'free trade within the Empire.' Similarly, in the U.S.A. A. became an urgent national economic problem requiring solution, according to different schools of thought, by such measures as the tariff, improved transportation, and the formation of a Federal Farm Committee to devise remedies in the way of co-operative marketing and clearing-houses for agric. products. As in England, there was a growing realisation of the ramifications of A. and an appreciation of the fact that it was by no means a single industry, capable of regeneration by a simple panacea, but rather a con-

geries of specialised and mutually exclusive industries, depression in any one of which must have its repercussion on the rest. Thus remedies by a single legislative measure were not widely advocated, while attention became more closely centred in scientific research and in investigation of the causes of depression.

The Wheat Act of 1932 secures to growers of home-grown millable wheat a standard price and a market. The registered grower is entitled to receive from the Wheat Commission a 'deficiency payment' representing the difference between the average and standard price—standard price being 10s. a cwt. The money is provided out of a Quota Fund controlled and managed by the Flour Millers' Corporation. By an amending Act, 1939, the minister can, through an *ad hoc* committee, vary the standard price if general economic and agric. conditions justify that course; and he also has power to suspend quota payments where the average price has ceased to be under the standard and having regard to the amount standing to the credit of the fund. Under the Ottawa Agreements Act, 1932, the Board of Trade, in consultation with the Ministry of A., may regulate the importation of frozen meat and chilled beef. By the Agricultural Marketing Act, 1933, the Board of Trade may regulate the importation of any agric. product if a marketing scheme dealing with that branch of the industry is either in force or in course of preparation; but the board's power is not exercisable in relation to live-stock or to meat—other than bacon (Livestock Industry Act, 1937). Measures were taken before 1939 to reorganise pig production and also to enhance the prices of agric. and market-garden produce by duties on imported produce. The area sown to wheat in 1939 was not far short of 20 per cent greater than it was at the end of 1931, but that under barley and oats tended to decrease. Generally speaking, it may be assumed, however, that world conditions before the Second World War produced a second industrial revolution in which supply had outrun consumption. Prices might be artificially raised through quantitative regulation of imports, combined with measures calculated to secure a better organisation of different sections of the industry; but the opinion was widely held that more drastic measures were required to put the country on a footing that would ensure that it could rely on itself for its food supplies for any length of time in an emergency. After the Second World War, however, the damage caused by the war and the dislocation of agric. production led, in 1946, to a serious fall in the world production of wheat. A large number of countries, including the largest producers of grain, had reaped abnormally small crops, and the world was faced with conditions which threatened famine, besides setting back all plans for reconstruction. But apart from abnormal conditions

modern A. always requires assistance from research in agric. science and from improvements in agric. machinery. Many farms in Great Britain have been worked out and would, under present conditions, prove too costly to restore to a profitable state of cultivation. Soil, too, even under rotation cultivation, needs replenishing with expensive manures, and the cost both of manuring and draining poor soil is prohibitive. Legislation to assist farmers to increase the fertility of their land is exemplified in the Agricultural Act of 1937, under which provision is made for financial aid to purchase lime and basic slag. That Act and the Agricultural Development Act, 1939, provide for securing farmers against low prices for oats, barley, and fat sheep by subsidy payments or through schemes for promoting sales and stabilising the market; for raising the limit of the quantity of wheat in respect of which deficiency payments under the Wheat Act, 1932, might be made at the full rate; and for making further grants for land drainage. Extended powers as to drainage schemes are given by the Agriculture (Miscellaneous Provisions) Act, 1943. Statutory provision for the better organisation of the livestock industry and related industries is made by the Livestock Industry Act of 1937. Under this Act a subsidy might be paid to producers of fat cattle, the importation of livestock and meat might be regulated, as, e.g. by quota restrictions or levies, and a commission was set up to develop and organise the whole livestock industry.

*The Agriculture Bill, 1946.*—In principle, a largely agreed measure arising out of wartime consultations. It came before Parliament at the end of 1946, as the most comprehensive and far-reaching effort that any Gov. has made to deal with A. and the use of land for food production. The Bill seeks to provide stability through guaranteed prices and assured markets. In the context Part I. of the Bill sets out the proposed machinery for promoting and maintaining the lasting basis for 'a stable and efficient agricultural industry capable of producing such part of the nation's food as in the national interest it is desirable to produce in the United Kingdom and of producing it at minimum prices consistent with proper remuneration and living conditions for farmers and workers in agriculture, and adequate return on capital invested.' The products to be covered by guaranteed prices and assured markets include livestock, milk, eggs, grain, potatoes, and sugar beet, but not horticult. crops, for which other means will be devised. As regards husbandry, the Bill seeks to encourage the farmer who takes good care of his land while obtaining a full output. The tenant who improves his farm is assured fuller compensation when he leaves; and as a corollary the tenant whose farming is not up to standard gets shorter shrift. An agric. land commission is proposed to manage land taken over by the Ministry of A. The co. agric. executive committees are continued as the ministry's agents on the same basis as before; and

there is also to be an agric. land tribunal for each area of England and Wales, to which will be referred questions of the dispossession of owners and occupiers on the grounds of bad estate management or bad husbandry, and such matters as directions served on owners to provide fixed equipment, consent to notices to quit, and the division of farms. The decision of these tribunals will in all cases be final. Another part of the Bill deals with the provision of more small holdings by co. councils for men with previous agric. experience.

*Organisation of Agricultural Education in Britain.*—Although in many ways Great Britain is still behind such countries as the U.S.A., Germany, Denmark, and Sweden, considerable progress was made before the First World War in agric. education, upon which the future of A. so largely depends. The twofold system of univs. and colleges for higher education and the co. council courses for young persons, which now prevail, were merely the putting into execution of plans which were far advanced before the First World War, but stopped by that period of disturbance. These plans envisaged the replacement of the pre-existing and chaotic work of a large number of authorities of various kinds by an imitation of the Scottish system of agric. provs., with depts. of the univs. at the head of each. Scotland has 3 such provs., under the univs. of Aberdeen, Glasgow, and Edinburgh. It was proposed to divide England into 12 provs., with a central institution at the head of each, the institutions being Aberystwyth Univ. Coll., Bangor Univ. Coll., Bristol Univ. (with the associated Royal Agric. Coll.), Camb. Univ., Harper Adams Coll., Leeds Univ., Midland Agric. Coll., Armstrong Coll., Newcastle-on-Tyne, Reading Univ. Coll. (now Univ.), Seale-Hayne Coll., Newton Abbot, Manchester Univ. (with the associated college at Holmes Chapel), and Wye Coll. (part of London Univ.). This organisation has now been adopted, and 2 other institutions have been added, namely Oxford Univ. and Nottingham Univ. Coll., making 14 institutions in all where the higher teaching and research are to be given, aided by experimental stations at Rothamsted, Woburn, and elsewhere. Closely correlated with, and looking for advice, to the central institution in each 'province' are the 'farm institutes' (as was proposed before the First World War), broadly similar to those which have for some time been estab. at Basing, Ridgmont, and Newton Rigg, and well known in other countries. The position of these institutes has been fixed in accordance with the nature of local farming, and with due regard to convenience of access. The univs. and colleges provide courses of 2 to 3 years in duration, with diplomas or degrees. As advisory centres they employ specialists in chem., entomology, and the like, as contradistinguished from the general education given by technical instructors under the co. councils. These latter bodies provide short courses for

boys and girls already on the land or intending to return to it. The farm institutes usually give a 6-months' winter course in practical A. to young persons of 16 years of age and upwards, and in summer courses in dairying and poultry farming. Some co. councils, however, have organised only a more economical and less efficient system of evening lectures and day classes, without the obvious advantage of facilities for actual practical training on neighbouring farms, where various 'demonstrations' and 'experiments' of agric. importance are conducted. Under the Agricultural Land (Utilisation) Act, 1931, for promoting the better utilisation of agric. land in Great Britain and the settlement of unemployed persons on it, the Ministry of A. is empowered to acquire and hold land for use as demonstration farms. All this work is under the control of the Ministry of A. and Fisheries, but the system is made complete by linking up certain activities of the Ministry of Education, especially the imparting of a 'rural bias' to rural elementary and secondary schools. This is particularly important, since the children of tenant farmers mostly receive their education at the latter, and the children of agric. labourers at the former. This concentration on a 'rural bias' takes the form of giving lessons in geography with special reference to the physical characteristics of the dist., effect of climate, and the like, but compulsory further education would greatly promote the ends in view.

(See also AGRICULTURAL BUREAUX, IMPERIAL; AGRICULTURAL CREDIT; AGRICULTURAL HOLDINGS; AGRICULTURAL RESEARCH; AGRICULTURE, INTERNATIONAL INSTITUTE OF; AGRICULTURE IN U.S.A.)

**Bibliography.**—GENERAL AND HISTORICAL: J. A. R. Marriott, *The English Land System*, 1914; Lord Ernle, *English Farming, Past and Present*, 1936; J. A. S. Watson and J. A. More, *Agriculture: The Science and Practice of British Farming*, 1915; W. Frean, *Elements of Agriculture*, 1946; R. G. Stapledon, *The Land Now and To-morrow*, 1946. SOILS AND FERTILISERS: E. W. Hilgard, *Soils*, 1906; B. A. Keen, *The Physical Properties of the Soil*, 1931; F. H. Billington, *Compost for Garden Plot or Thousand-acre Farm*, 1942; J. S. Remington, *The Manure Note Book*, 1943. CROPS: J. Percival, *Agricultural Botany, Theoretical and Practical*, 1936; H. G. Sanders, *An Outline of British Crop Husbandry*, 1939; N. B. Hagenaal (ed.), *Fruit Growing: Modern Cultural Methods*, 1945; H. I. Moore, *Grassland Husbandry*, 1946. FARM STOCK AND BREEDING: R. Wallace and J. A. S. Watson, *Farm Livestock of Great Britain*, 1923; F. H. Garner, *The Cattle of Britain*, 1944; E. T. Brown, *The Poultry-keeper's Text-book*, 1944; J. Anderson, *The Semen of Animals and its Use for Artificial Insemination*, 1945; A. L. Hagedorn, *Animal Breeding*, 1946. PESTS AND PLANT DISEASES: W. E. Brenckley, *Weeds of Farm Land*, 1920; J. Eriksson, *Fungus Diseases of Plants in Agriculture, Horticulture, and Forestry*, 1930; J. Ritchie, *Beasts and Birds as Farm Pests*, 1931;

E. D. Sanderson, *Insect Pests of Farm, Garden, and Orchard*, 1941. DRAINING AND BUILDINGS: B. W. Adkin, *Land Drainage in Britain*, 1933; H. H. Nicholson, *The Principles of Field Drainage*, 1912; E. Gunn, *Farm Buildings: New and Adapted*, 1945. ECONOMICS AND MARKETING: J. A. Venn, *The Foundations of Agricultural Economics*, 1933; J. T. Horner, *Agricultural Marketing*, 1935; R. Cohen, *The Economics of Agriculture*, 1912. See also bibliographies for AGRICULTURAL MACHINERY AND IMPLEMENTS; CATTLE; DAIRYING; HORSES, etc.; publications of the Ministry of A. and Fisheries, and of the various agric. societies.

**Agriculture and Fisheries, Ministry of.** The predecessor of this ministry was the Board of A. and F. which owed its origin to a special dept. of the Privy Council created in 1865 to look after and control the agric. interests of the country. The immediate cause of the appointment of this veterinary dept., as it was called, was the outbreak of the cattle plagues which ravaged England during the middle of the sixties of last century. In 1883 the term agricultural was applied to the committee and the board was actually formed in 1889. In 1903 the duties of the fisheries dept. of the Board of Trade were transferred to the Board of A. In 1919 an Act was passed reorganising the work of the board and giving it the title of Ministry. The Ministry is controlled by a minister who usually holds Cabinet rank. His appointment is political, and changes with a change of Gov. The presidency carries with it a salary of £5000 per annum. In addition, there is a parl. secretary, who has a salary of £1500. The Ministry has the responsibilities entailed by the Contagious Diseases Act, and acts in order to prevent the outbreak or spreading of these diseases amongst cattle, as was exemplified in 1912, when the dreaded foot-and-mouth disease (q.v.) broke out. It controls also the agric., horticult., and foresting interests of the country, being assisted in the latter case by the Forestry Commissioners, a body created under the Forestry Acts, 1919 to 1927. It has also indoor and outdoor animals depts., a fisheries dept., a veterinary dept., and an educational dept., which has now been developed much more rapidly than formerly. It controls also the Ordnance Survey of the United Kingdom. A special Welsh dept. was created by the Act of 1919, while Scotland has its own Ministry of A., estab. in 1912. The popular Kew Gardens (London) are controlled by the Ministry.

**Agriculture in U.S.A.**—Practically every known kind of field crop is cultivated in the U.S.A., but the cereals (Indian corn, hay, cotton, wheat, and oats in the order of their importance) represent three-fourths of the total value of all Amer. crops. The extent of arable land under cultivation is nearly 400 million ac., and pasture land 783 million ac. According to census returns the total acreage of farms was 1,054,515,000 and the improved acreage

was 513,914,000 in 1935 and the number of farms 6,812,000. Cash income from farm production in 1937 was 8,120,000,000 dols. (excluding gov. grants.) The value of farm property is approximately 57½ billion dols. The farm pop. in 1935 was estimated at 31,801,000. This figure was higher before the agric. depression of 1921-24, from which A. has only recovered in recent years. During this time most of the farmers' wartime prosperity was devoted to meeting post-war conditions—a larger market, lower prices, and less labour. A. in America has developed rapidly along the lines of mechanisation, and thus a greater production has been obtained on a smaller crop acreage and with fewer workers. The future tendency of A. is towards larger farms and greater technical improvements both in farm machinery and in the scientific care of crops and live-stock. The most stable and important of Amer. crops is Indian corn, the yield in the years 1935-37 being 2296, 1524, and 2644 million bushels, respectively, which represents more than half the world's supply. The 6 most productive states of the 'corn-belt' are Iowa, Illinois, Nebraska, Missouri, Indiana, and Ohio, but Indian corn is widespread over the whole of the U.S.A. The flourishing stock-breeding industry depends largely on the corn crop, of which about 85 per cent is fed to live-stock, chiefly hogs. The forage crops, which are second in importance, include pasture, hay, clover, alfalfa, etc. The third most important crop, cotton, is dealt with under that head. The wheat crop, fourth in importance, covers about 5½ million ac., principally in the states of Kansas, N. Dakota, Minnesota, Nebraska, S. Dakota, Washington, Illinois, Oklahoma, Indiana, Ohio, and Missouri. Amer. and Canadian wheat is called winter wheat or spring wheat, according to the season of sowing. Winter wheat represents nearly three-quarters of the Amer. produce, and the yield of both kinds was 574 million bushels in 1937. The U.S.A. is the largest wheat-growing country in the world, and in addition produces a quarter of the world's supply of oats, thereby equalling Russia. The average ann. oats crop is over 1000 million bushels, half of which is produced in Illinois, Iowa, Wisconsin, Minnesota, Nebraska, and Indiana. Other important Amer. crops with their average yield in millions of bushels are: barley (217), rye (44), rice (46), flax seed (9), and buckwheat (7). In addition, there are the legume crops, field beans, soy beans, and peas, while the white potato crop is 386 million bushels and the sweet potato crop 83 million bushels. Of the fruit production, apples and peaches form the largest share, being 185 million bushels and 70 million bushels respectively. In addition to field crops, the U.S.A. is the largest stock-breeding country in the world, the estimated figures for 1937 being 66 million cattle, 43 million swine, and 53 million sheep.

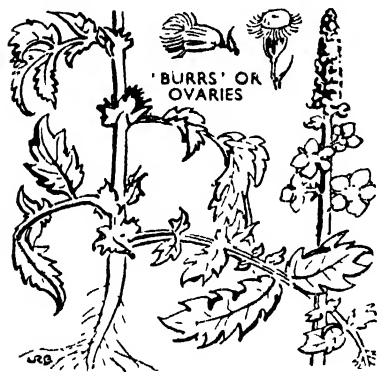
Tobacco, in 1937, was harvested from 1,706,000 ac. producing 1506 million lb. It is grown in over a score of states, but chiefly in N. Carolina, Kentucky, Virginia, Tennessee, S. Carolina, Georgia, and Pennsylvania.

*Agric. Education in the U.S.A.*—Agric. education in the U.S.A. has a long hist., and, like many sound movements, had its beginnings in the efforts of private individuals interested in the productivity of the land. Comparatively early in the last century vocational training in A., as indeed in other industries, was a feature of the manual labour schools in New York state. By the latter part of the nineteenth century co. agric. schools had become well estab., and in the first decade of the present century over 50 agric. high schools were in existence, while agric. courses were given in hundreds of ordinary high schools. The system now comprises agric. schools, dist. agric. schools, agric. depts. of high schools, and ordinary schools giving instruction in elementary A. At the apex of the system of agric. education in the U.S.A. are the agric. colleges or state colleges and univs., in direct association with the U.S. Dept. of A. These institutions are mainly concerned with research and experiment, this latter function being carried out at stations organised by the dept. under the Hatch Act of 1887.

*Agriculture, International Institute of.* This body, which has been in existence since 1905, now receives contributions from over 50 countries for the continuance of its activities in collecting and publishing all kinds of information on farming, crops and live-stock, production, trade in agric. products, wages, new diseases of crops, and agric. co-operative insurance and credits. The institute has its seat in Rome, in the Villa Borghese. The governing body consists of a General Assembly of delegates of the Member Govs. (over 60 in number), meeting biennially, and of a permanent committee of delegates, mostly resident in Rome, acting as its executive. There are special bureaux dealing with general statistics, agric. science, and agric. economics, respectively. Its library is one of the best stocked of libraries specialised in A. Attention is not restricted to the purely technical studies, special stress being also laid on rural economics and sociology, agric. statistics and legislation. Auxiliary sciences, such as botany, chem., and geology, etc., are well represented in the library. Information on agric. questions is supplied by the institute mainly through its various publications, issued mostly in Eng. and Fr. These, for many years, have included 2 year-books, the *International Year-Book of Agricultural Statistics* and the *International Year-Book of Legislation*, as also the *International Review of Agriculture* pub. monthly. In consequence of a resolution of the General Assembly of 1924, the institute took steps to promote the establishment of a world agric. census. Some 63 countries took part in the first census which covered the period 1920-30.

Consult *The International Institute of Agriculture: an Historical and Critical Analysis of its Organisation, Activities and Policies of Administration*, by A. Hobson, 1931. See also under AGRICULTURE.

**Agrigentum** (Gk. *Acragas*), now *Girgenti* (q.v.), a tn. on the S. coast of Sicily. It was founded by a Doric colony from Gela about 579 B.C., was at first free, but came under the gov. of the tyrant Phalaris c. 570-549, and later under that of Theron, 488-472. It flourished in wealth and luxury, and was one of the most splendid cities of the anc. world. It was, however, destroyed by the Carthaginians, 405, and, though rebuilt by Timoleon, it never regained its former greatness. In 210 it came under the rule of the Romans. It was the bp. of the philosopher Empedocles. There are remains of the temples of Jupiter, Heracles, Æsculapius, and Concord. The modern Girgenti is irregularly built, is a bishop's see, and does a small trade in corn, fruit, and sulphur.



**Agrimonia**, a genus of the Rosaceæ, commonly known as *agrimony*. It has medicinal properties, and is used in herb teas. *A. odorata* and *A. eupatoria* are found in fields and under hedges.

**Agrinion** (*Vrachori*), a tn. of Acarnania and Ætolia, Greece, 18 m. N. of Missolonghi. It has a considerable trade in tobacco. Pop. 11,890.

**Agriope** (Gk. *αγριοψος*, fierce-looking), a genus of acanthopterygious fishes, belonging to the family Scorpionidae of the order Amieidae. They are distinguished from allied genera by their suborbital plates, which extend backwards over the cheeks and thus protect them. The *A. forvus*, found near the Cape of Good Hope, exceeds 2 ft. in length, and is called a *zee-paard*, or sea-horse, by the Dutch colonists; the *A. verrucosus*, or warty A., also found at the Cape, has the skin of the head and body entirely covered with prominent conical pro-

tuberances; the *A. Peruvianus*, found near the S. Amer. coast, is 8 or 9 in. long.

**Agrippa, Heinrich Cornelius** (1486-1535), Ger. philosopher and occultist, had a stressful and troublous career as writer, soldier, physician, and lecturer. His chief works are the *De Incertitudine et Vanitate Scientiarum* and *De Occultis Philosophiæ*, 1531-33. See *Life* by Henry Morley, 1856.

**Agrippa, Herod**, see HEROD.

**Agrippa, Marcus Vipsanius** (63-12 B.C.), Rom. general and naval commander, came of a humble family, but by means of his own ability and the influence of his friend Octavius, afterwards the Emperor Augustus, attained to high position. After the murder of Cæsar he accompanied Octavius to Italy, where he distinguished himself in the first war against Antony. Later, as consul, he held the command in Gaul, defeating the Aquitani and inflicting severe punishment on the Ger. tribes beyond the Rhine. As commander of the fleet he was largely responsible for the defeat of Pompey, gaining signal victories at Mylae and Naulochus. At the famous battle of Actium he defeated the combined fleets of Antony and Cleopatra. By his third wife, the daughter of Octavius, he had Agrippina, afterwards wife of Germanicus. See C. Merivale's *History of the Romans under the Empire*, 1850-62.

**Agrippa, Menenius**, Rom. consul in late sixth century B.C. Famous for his conquest of the Sabines and Samnites, and as the supposed originator of the fable of 'The Belly and the Members,' used as an allegory to calm the rebellious plebs. See Livy, bk. ii., and Shakespeare's *Coriolanus*.

**Agrippina the Elder** (d. A.D. 33), daughter of M. Vipsanius Agrippa and Julia, daughter of Augustus, endeared herself to the Rom. populace by bravery displayed in the Ger. campaigns of her husband Germanicus. On the mysterious death of the latter, probably engineered by the jealous Tiberius, her popularity aroused the emperor's hatred, and she was banished to the Isle of Pandataria, where she is supposed to have starved herself to death. She was the mother of the notorious A. the Younger and Caligula. See Tacitus's *Annals*; S. Baring-Gould's *Tragedy of the Cæsars*, 1892; and J. B. Bury's *Roman Empire*, 1893.

**Agrippina the Younger** (A.D. c. 15-59), daughter of Germanicus and Agrippina, was mother of Nero by her first husband, (n. Dom. Ahenobarbus (d. A.D. 40). Her second husband, Crispus Passienus, she was accused of poisoning. She married thirdly her uncle, the Emperor Claudius, and induced him to set aside his own son, Britannicus, in favour of Nero. She then had him poisoned, and Nero became emperor under her regency. Tiring of her ascendancy, Nero had her slain. See S. Baring-Gould's *Tragedy of the Cæsars*, 1892, and J. B. Bury's *Roman Empire*, 1893.

**Agropyrum** (from Gk. *ἀγρός*, field, *πυρός* wild wheat), a genus of plants,

belonging to the order Gramineæ. *A. repens*, the quitch or couch-grass, roots at the nodes of its long rhizome, and is very troublesome to destroy in cultivated soil, rooting as it does wherever it is cut.

*Agrostis*, a genus of creeping grasses (order Gramineæ), of which 2 species, *A. alba* and *A. vulgaris*, are found in Britain, and are called respectively *marsh bent* and *fine bent*. *A. alba*, the Irish floricorn grass, forms a valuable pasture.

*Agtelek* or *Aggtelek*, a vil. of Gomór, Hungary, which is famous for its large stalactite cavern. It is second in size to the Mammoth Cave of Kentucky (*q.v.*), and is called Baradla (steaming-place).

*Aguadilla*, seaport in Puerto Rico, standing on a beautiful bay of the same name, 65 m. W. of San Juan. It has a large trade in coffee, sugar, and tobacco. Pop. 21,400.

*Aguado, Alexandre Marie* (1784-1842), famous Fr. financier, b. at Seville; was aide-de-camp to Marshal Soult in the Sp. war of Independence; left army in 1815 and entered the banking world. In 1823 he became the financial agent of Spain in Paris, and negotiated sov. important Sp. loans and the Gk. loan of 1834. In 1823 he was naturalised as a Fr. subject. He received from Ferdinand VII. the title of Marquis de las Marismas del Guadalquivir. D. at Gijón, Spain, leaving an immense fortune.

*Aguardiente* (burning water), a coarse kind of Sp. brandy, made from grain or potatoes, and flavoured with aniseed.

*Agua Calientes*, tn. and state, Mexico, so called from hot springs in the vicinity. The tn., 270 m. N.W. of Mexico city, has a considerable trade, and is noted for its beautiful fruit gardens and fine climate. Pop. (tn.) 82,200; (state) 133,000.

*Ague* (O. Fr. *ague*, sharp), a term applied to malarial fever, particularly to the variety in which a paroxysm of intense chill, causing shivering and chattering of the teeth, alternates with a hot stage, when the face is flushed and the skin hot to the touch. The cause is infection by a parasite associated with the mosquito, and the treatment consists of the use of quinine. See MALARIA.

*Aguesseau, Henri François d'* (1668-1751), native of Limoges, was in succession advocate-general (1690), procurator-general (1700), and chancellor of France. He lost the chancellorship in 1718, through his opposition to Law's system of finance, recovered it in 1720, lost it again in 1722, and assumed the office for the last time in 1737. According to Voltaire, he was the most learned magistrate France ever had. His works were pub. in 13 vols. See biographies by Boullée, 1849, and Monnier, 1864.

*Aguilar, Grace* (1816-47), novelist and Jewish historian, b. at Hackney of Jewish parents. Her chief works are: *The Spirit of Judaism*, 1842; *The Jewish Faith*, 1845; *The Women of Israel*, 1845; and the famous novel *Home Influence*, 1847.

*Aguilar de la Frontera*, tn., Sp. prov. of Andalusia, 22 m. S.E. of Cordova. Has the ruins of a magnificent Moorish

castle. The chief trade is in wine, corn, and oil. Pop. 13,000.

*Agulias*, seaport of Murcia, Spain, on Mediterranean, 38 m. S.W. of Cartagena. It exports lead, esparto grass, soda, grain, and iron ore, and has large smelting works. Pop. 17,078.

*Aguilera, Ventura Ruiz* (1820-81), Sp. lyric poet, b. at Salamanca; went to Madrid in 1843, and there occupied many official and journalistic positions under the liberal Gov. Among his works are: *Sátiras*; *Eros nacionales*; *Elegías*, 1862; *Armonías y Cantares*, 1865; *La Arcadia moderna* and *Legenda de Noche Buena* (1872). Selections from his poems, entitled *Inspiraciones* and *Poesías*, were pub. in 1865 and 1880 respectively, and his complete works at Madrid in 1873.

*Aguinaldo, Emilio* (b. c. 1870), Filipino revolutionary leader. At the outbreak of the 1896 rising he was mayor of Cavité Viejo, but, in consequence of the part he took in the rebellion, consented to go into exile at Hong Kong. He returned in 1898 to aid the U.S.A. against Spain, but turned against them on their purchase and annexation of the is., and attacked Manila in Feb. 1899. Fighting continued with varying success till Mar. 1901, when A. was captured by Gen. Funston at Palawan. He swore allegiance to the U.S.A. the next month, and retired into private life.

*Agulhas, Cape* (The Needles), the most southerly point of Africa, so called by the Portuguese from its sharp-pointed rocks. It is dangerous to shipping, on account of fogs, rocks, and uncertain currents. The Agulhas Bank, with an average breadth of 40 m., stretches for 150 m. from the cape to the Great Fish R.

*Agustina* (d. 1857), the 'Maid of Saragossa.' A vivandière of the Sp. army, who attained fame by her gallant behaviour during the siege of Saragossa by the Fr., 1808-9. See Byron's *Childe Harold* and Southern's *History of the Peninsular War*, 1823-32.

*Ahab*, son of Omri and king of Israel (918-896 B.C.), married Jezebel, the daughter of Ethbaal, king of the Sidonians, and through her influence introduced the worship of Baal. This and the subsequent persecution of the priests and prophets of Jehovah brought him into conflict with Elijah, who managed to hold his ground. Though lacking in moral courage, A. united considerable personal courage with a public spirit that evinced itself in a fondness for the construction of fine buildings. He twice defeated the Syrians, but was finally killed in battle with them at Ramoth-Gilead. See 1 Kings xvi. and xxii., and Kittel's *History of the Hebrews*, 1895-96.

*Ahanta*, a small dist. in the Gold Coast, Africa, noted for its gold. It is a Brit. possession.

*Ahasuerus*: 1. The traditional name of the Wandering Jew. 2. The name of several Persian kings mentioned in the Bible, of whom the best known, the husband of Esther, has been identified with Xerxes. The name is probably a title.



**Ahaz**, eleventh king of Judah (741-725 B.C.), being attacked on his accession by the kings of Israel and Syria, and also by the Edomites and Philistines, summoned to his assistance Tiglath-Pileser, king of Assyria, who exacted from him heavy tribute. See 2 Kings xvi., Isa. vii.

**Ahaziah**: 1. Son of Ahab and eighth king of Israel (896-894 B.C.), was, like his father, an idolater, and worshipped Baal and Astarte. When about to attempt to suppress the Moabites, who had revolted on his accession, he was fatally injured by a fall from a window. See 1 Kings xxii. and 2 Kings i. 2. Sixth king of Judah (885-884 B.C.), nephew of the foregoing, was killed in the insurrection which broke out under Jehu, the son of Nimshi. See 2 Kings viii., 2 Chron. xxi.

**Ahimelech**, Jewish high priest, who at Nob led David with the shewbread and gave him the sword of Goliath, thus assisting him to escape from Saul (1 Sam. xxi. 1-10). He was put to death by Saul (1 Sam. xxii. 11-20).

**Ahlen**, tn. of Westphalia, Germany, on R. Weser, 20 m. N.E. of Münster. The chief manufs. are linen and enamels. Pop. 25,400.

**Ahlqvist, August Engelbert** (1826-89), Finnish philologist, after studying at Helsingfors, founded the newspaper, the *Suometar*, travelled extensively through N. Russia and Siberia, and in 1863 became prof. of Finnish language and literature at Helsingfors. He pub. many works on philology, some poetry, and an account of his travels.

**Ahmed I.**, sultan of Turkey (1589-1617), succeeded his father, Mohammed III., in 1603. The most notable events in his career are the conclusion of the peace of Sitvatorok with Austria in 1606 and the unsuccessful war with Persia.

**Ahmed II.**, sultan of Turkey (1643-1695), succeeded his brother Solymun II. His forces, under Kiiuprili, were driven from Hungary after their bad defeat at Salankamen, 1691.

**Ahmed III.**, sultan of Turkey (1673-1736), succeeded his brother Mustapha II. The most notable events in his career are the war with Russia, the recovery of Morea from Venice in 1715, and the 2 defeats by the Austrians, at Peterwardein 1716, and Belgrade 1717. He was de-throned in 1730.

**Ahmedabad**, or **Ahmabad**, city and dist. of India, in prov. of Gujarat, Bombay Presidency. The city, 350 m. N. of Bombay, on the Sabarmati R., was founded by Ahmed Shah in 1412. It was ceded to the E. India Company in 1818, and suffered severely from earthquake in the following year. Though now in a state of decay, it retains many vestiges of its former magnificence, notably the Jama Masjid, or Great Mosque, built in 1421, the Ivory Mosque, the Ivory interior of which is lavishly decorated with jewels, and the modern Jain temple. From 1573 to 1600 it is said to have been the handsomest tn. in Hindustan, perhaps in the world, and in spite of being one of the most impor-

tant centres of the cotton trade with 74 mills employing 44,000 hands, besides its manufs. of pottery, paper, silk, and metal ware, it is still a most beautiful city. In 1615 it was a 'goodly city as large as London.' Pop. of city 314,000; dist. 900,000.

**Ahmed Fuad**, see **FUAD I.**

**Ahmednagar**, or **Ahmadnagar**, city and dist. of India, Bombay Presidency. The city, situated 120 m. E. of Bombay, was founded in 1494 by Ahmed Nizam Shah. It was captured from the Mah-rattas by Gen. Wellesley in 1803, but restored to them. It was finally ceded to the Brit. in 1817, by the treaty of Poona. Under Brit. rule its prosperity greatly increased and there is a large trade. It was the headquarters of the 11th Infantry Brigade. It is an important mission centre. Pop. 50,000; dist. 732,900.

**Ahmedpur**, or **Ahmadpur**, tn., India, state of Bahawalpur, 30 m. S.W. of tn. of Bahawalpur. Has manufs. of cotton and silk. Pop. 30,000.

**Ahmed Shah**, first monarch of Afghanistan (1747-73), was the son of Sammaun Khan, chief of the Abdali tribe. After the murder of his master Nadir Shah, he retired to Afghanistan, where he was elected ruler. He was a fine soldier and greatly extended the Afghan dominion.

**Ahriman** (**Angra Mainyu**, literally 'the Destroyer'), the spirit of evil, opposed to Ormazd, the principle of good, in the Zoroastrian system. Warfare must be waged between the two for 12,000 years, at the end of which A. will be defeated by Ormazd. A. is the source of evil, and has existed since the commencement of the world. See J. Darmesteter's *Ormazd et Ahriman*, 1877.

**Ahuachapan**: 1. Dept. in San Salvador, Central America. The fertile valleys of the Coast Range produce sugar, coffee, tobacco, cotton, and fruit. Pop. 64,000. 2. Cap. city of dept. of same name, 17 m. N.W. of San Salvador. Pop. 29,500.

**Ahwaz**, a Persian tn. on the Karun, 46 m. S. of Shush. Remains of an anc. tn. are found near it, including those of a citadel of vast dimensions. Pop. 50,000.

**AI** (Heb., heap), a Canaanitish city E. of Bethel. Abraham pitched his tent between Bethel and AI (Gen. xii. and xiii.), but the city is better known for its capture by Joshua in later times (Joshua vii. and viii.). Its ruins existed in the time of Eusebius and Jerome, but none are now to be found.

**AI** (sloth), see **BRADYCES**.

**Aicard, Jean François Victor** (1848-1921), Fr. author, b. at Toulon. His works, mainly poetical and dramatic, include: *Jeunes Croquances*, 1867; *Au clair de la lune*, 1870; *Les Rébellions et les apaisements*, 1871; *Poèmes de Provence*, 1873; *La Venus de Milo*, 1874; *La Chanson de l'enfant*, 1876; *Miette et Nore*, 1880; *Lamartine*, 1883; *Jesus*, 1896; *Talus*, 1902; *L'Âne d'un enfant*, 1903; *Légende d'un cœur*, 1903; *Benjamine*, 1906; *Maurin des Maures*, 1908, and *L'Illustre Maurin*, 1909, both trans. by Alfred Allinson, 1910; *Alfred de*

*Vigny* (Conférences, etc.), 1914; *Le Témoin* (poems), 1916; *Des cris dans la mêlée*, 1916; *Le Fameux Chevalier Gaspard de Besse*, 1919; *Forbin de Solières* (play), 1920; *Pages rétrospectives de la guerre sous-marine en Méditerranée* (c. 1923).

**Aidan**, St. (d. 651), a monk in the monastery of Iona, was in 635 sent by the abbot on the request of King Oswald of Northumbria to evangelize that country. Cormac, a monk previously sent from Iona on the same errand, had failed through his impatience and intolerance; but the saintly gentleness of A. brought forth much fruit, in spite of the opposition of Penda, heathen king of Mercia. A. was consecrated bishop, and estab. his see at Lindisfarne.

**Aide-de-Camp** (Fr. camp-assistant), an officer attached to the personal staff of an admiral or general, with whom he is in confidential touch when on active service, assisting him in all the military routine and looking after his comfort. The sovereign may have any number of As., and this position is given as an honorary distinction. The usual abbreviation is A.D.C.

**Aidin**: 1. Vilayet in Asiatic Turkey, known also as vilayet of Smyrna (Izmir). Chief tn., Smyrna. Pop. of A., 261,000. 2. Important tn. in vilayet of Smyrna in valley of Menderes, near site of anc. Tralles. Has tanneries and large trade in figs and cotton. The Gks. held it for a time after the First World War but lost it to Turkey in the Greco-Turkish War, 1921-22. Pop. 37,000.

**Aidone**, tn. in Sicily in prov. Caltanissetta, on the Serra Orlando Mt. Near A. are extensive remains of an unknown city. Pop. 7890.

**Aids**, under the feudal system, were payments due from vassal to lord under certain conditions.

**Aigues-Chaudes**, see EAUX-CHAUDES.

**Aigues Mortes** (Lat. *Aquæ Mortuæ*), a small tn. in the Fr. dept. of Gard, situated 3 m. from the Mediterranean. Saint Louis made it a port and sailed thence in 1248 and 1270 for the Crusades. It is now of little importance. Pop. 4511.

**Aiken**, co. seat of A. co., S. Carolina, U.S.A., 17 m. E.N.E. of Augusta, Georgia; a health resort chiefly visited by Northerners, and seat of the Immanuel Training School for negroes. Pop. 6000.

**Aikin**, John (1747-1822), b. at Kibworth, Leicestershire, studied medicine at Edinburgh and London, later taking the degree of M.D. at Leyden, 1780. Besides practising at Chester, Warrington, and London, he wrote voluminously. Among his works are the well-known *Evenings at Home* (written in conjunction with his sister, Mrs. Barbauld) and his *General Biography*, 1799-1815.

**Aikin**, Lucy (1781-1864), b. at Warrington and d. at Hampstead. She wrote *Lorimer*, 1814, a novel, but her reputation rests mainly on her court memoirs (a series of which the *Memoirs of the Court of Elizabeth*, 1818, is the first) and *The Life of Joseph Addison*, 1843.

**Ailanthus**, or **Ailanto**, is a genus of tropical trees which belong to the

Simarubaceæ. *A. glandulosa*, the tree of heaven, is cultivated in Britain; the leaves are like those of the ash. The wood is valuable to cabinet-makers.

**Ailleboust**, Louis de Coulonge (d. 1680), 3rd governor-general of Canada (1618-1651). It is believed that he landed in Canada with the founders of Montreal in 1642. Be that as it may, he represented the Montreal dist. in 1647 in the new colony's council at Quebec prior to succeeding Montmagny as governor-general in 1648. In his tenure occurred the destruction of the Huron nation by the Iroquois. A. belonged to the 'Compagnie de Montreal' formed in 1641. D. in Canada 1660.

**Ailly**, Pierre d' (1350-1420), Fr. theologian and prelate, was a famous leader of the Nominalists. He became chancellor of the Univ. of Paris, bishop of Compiègne, and papal legate in Germany. He took part in the Council of Constance.

**Ailsa Craig**, a rocky islet of columnar basalt off the W. coast of Ayrshire, Scotland. It is in the form of a cone, and rises abruptly from the sea to a height of 1114 ft. It has a lighthouse at the S. end.

**Aimard**, Gustave (1818-83), spent 20 years of his life in roving through Central America and Asia. He made use of the materials thus collected in writing novels of the Fenimore Cooper type, such as *The Trappers of Arkansas*, 1816, and *The Pirates of the Prairies*, 1878. Many have been trans. into Eng. see *Indian Scout*, Everyman's Library.

**Aimeo**, see EIMEO.

**Aimoin**, a Fr. Benedictine monk and historian, who d. in 1008. He wrote a hist. of the Fr. up to 654, and a life of Abbon, which gives an account of the manners and customs of the time.

**Ain**: 1. A Fr. riv. rising in the dept. of Jura, flowing through Jura and Ain into the r. b. of the Rhone, 18 m. above Lyons. 2. A dept. on the E. frontier of France, very mountainous in the E. and marshy in the N. Area, 2245 sq. m. Pop. 317,195.

**Ainabul**, see INEROIL.

**Ainger**, Alfred (1837-1901), b. in London, graduated from Trinity College, Cambridge, in 1860. In 1866 he was appointed reader at the Temple Church, in 1877 canon of Bristol, in 1894 Master of the Temple. He pub. sev. works, but he is best known as the biographer and editor of Charles Lamb. His works include *Crabbe*, 1903, in the English Men of Letters series, and various articles in the *Dictionary of National Biography*.

**Ainley**, Henry Hinchliffe (1879-1945), Eng. actor, b. at Morley, Yorkshire, descended from mining stock. While working in a Sheffield bank he became an amateur actor, and later went to Frank Benson for training and experience. George Alexander, struck with his fine physique and voice, cast him, still unknown to play Paolo in Stephen Phillips's tragedy *Paolo and Francesca* in 1902. As the romantic juvenile actor of the tn. he was soon conquering in America as 'The Little Minister' in Barrie's play.

But under Granville-Barker he obtained invaluable experience in styles as diverse as those of Gk. tragedy and Shavian comedy, passing from the name-parts in Euripides' *Hippolytus* and *Orestes* to that of Valentine in *You Never Can Tell*. Meanwhile at Stratford he kept up his Shakespearian work and in Granville-Barker's Shakespearian revivals (1912) at the Savoy he reached the highest point of his acting in his Leontes and Malvolio. He was also excellent as Joseph Surface and charming as Little Billee in *Trilby*. He had now perfected his vocal range, which made him the greatest verse speaker on the stage, while his majestic bearing enabled him to invest his parts with a physical quality denied to others. In 1913, under Barker, he reflected brilliantly the nervous realism of the shy artist Ilam Carve in Arnold Bennett's *The Great Adventure*. After serving as a runner in the First World War he was associated with Mr. Gilbert Miller in management at St. James's, his chief parts being Fedya in Tolstoy's *Reparation* and Antony in *Julius Cæsar*. During the next 10 years his most notable successes were in Milne's *The Dower Road*, Irvine's *The First Mrs. Fraser*, and James Bridie's portrait of an Edinburgh surgeon, *The Anatomist*. One of his later appearances was as Hamlet, in which his musical delivery compensated for his age. His last appearance on the stage was in 1932 though, in 1944, he read extracts from *Hassan* at the Poetry Society, a play in which he had taken the title-part in 1923.

**Ainmiller or Ainmuller, Max Emanuel** (1807-70), b. at Munich, where he was a glass-painter. Discovering various technical improvements, he extensively revived the art of glass-painting. His works include windows in St. Paul's Cathedral, London, and in Glasgow Cathedral.

**Ainsworth, William Francis** (1807-1896), b. at Exeter, graduated in medicine at Edinburgh in 1827. He then conducted some geological researches in the Auvergne Mts. and the Pyrenees, after which he travelled for some years in Asia, visiting Kurdistan. On his return, in 1838, he pub. *Researches in Assyria*, and later *The Claims of the Christian Aborigines in the East, 1843*, and *Travels in the Track of the Ten Thousand Greeks, 1844*.

**Ainsworth, William Harrison** (1805-1882), historical novelist, b. at Manchester, where his father was a solicitor. He was to have followed the same profession as his father, but he had little liking for it. He came to London to finish his studies and met there John Ebers, a publisher who was manager at that time of the Opera House; he thus met a great number of literary and musical people, and his charming manners found him many friends. In 1826 he married the daughter of John Ebers, and worked for some time in his father-in-law's business. He gave this up soon and devoted the rest of his life to journalism and literature. His first successful novel, pub. in 1834, was *Rookwood*, the hero

of which was Dick Turpin, and from that time on to 1881 he pub. about 39 novels. Some of these appeared in *Bentley's Miscellany*, *Ainsworth's Magazine*, and the *New Monthly*, while he was editor of these papers between the years 1840 and 1853. Among his friends were Dickens, Thackeray, Talfourd, and Cruikshank, who often visited him at his home in Kensal Green. His best-known novels are: *The Tower of London, 1840*; *Old St. Paul's, 1841*; *Lancashire Witches, 1841*; *Crichton, The Filch of Bacon, The Miser's Daughter, 1842*; *Windsor Castle, 1843*. See *William Harrison Ainsworth and his Friends*, by S. M. Ellis, 1910.

**Ain Tab**, a tn. of Asiatic Turkey, vilayet of Aleppo. It was once an important military post, and is now a flourishing centre of Amer. mission work. Trade, hides and leather. Pop. (Turkish, Armenian, and Gk.), 45,000.



AINUS

Paul Popper

**Ainus, or Ainos (man)**, a dying race now found chiefly in the N. of the is. of Yesso (Japan) and Sakhalin. They were probably the aborigines of the country, and early Jap. hist. tells of fierce conflicts with them. They are now very degenerate, and show few signs of intelligence. The A. are taller than the Jap., strong, and very hairy, though there is no ground for the tradition that their bodies are covered with hair. Their cheek-bones are high, their noses flat and broad, and their faces short. They are chiefly conspicuous for their dirtiness. They subsist on the products of fishing

and the chase and live in wretched huts, scantily furnished. Their prin. object of worship is the bear, though they pay no respect to the life of this animal, which they kill and skin without any fear, setting up its head in their vill. They believe, however, in a Supreme Creator and also in the immortality of the soul. Their religious notions are as vague as their knowledge on other subjects, for they have no written literature and are in consequence extremely ignorant.

The A. differ in physique, language, and customs from the other Asiatic races. During the last century they have been much studied and the bibliography of the subject is considerable. See I. L. Bird, *Unbeaten Tracks in Japan*, 1880; B. H. Chamberlain, *Aino Folk-tales*, 1888; R. Hitchcock, *The Ainos of Japan*, 1892; J. Batchelor, *The Aino and their Folklore*, 1901, and *Ainu Life and Lore*, 1927; G. Montandon, *La Civilisation ainoise*, 1937.

**Air or Asben**, a fertile but mountainous region of the Sahara, situated between lat. 17° and 20° N. and long. 7° and 10° E. The pop. consists mostly of Tuaregs. Cereals and dates are extensively cultivated, and vegetation is luxuriant. An important caravan passes annually through the tn. of Asben. A. is the most populous part of the Sahara. Chief tn. Agades (q.v.).

**Air**, the atmosphere we breathe (see ATMOSPHERE); the characteristic or soprano part of a musical composition (see ARIA, MELODY); the bearing or manner of a person; in the plural, affected manners.

Up to the middle of the eighteenth century A. was thought to be a simple elementary substance, of which all other gases were modifications. Hence oxygen was first of all spoken of as 'dephlogisticated A.', nitrogen as 'phlogisticated A.', hydrogen as 'inflammable A.', and carbon dioxide as 'fixed A.' The idea of modifications of the atmosphere is still preserved in the use of such terms as mountain A., 'sea A.', etc.

A. is now known to be a mixture of gases, consisting approximately of 4 vols. of nitrogen to 1 of oxygen, with smaller quantities of carbon dioxide, water vapour, argon, helium, neon, krypton, xenon, ammonia, dust, sulphuric acid, etc. Carbon dioxide, though present in small proportion (0.03 per cent. by vol.), is nevertheless of great importance, as it forms the chief food of green plants.

A. may be liquefied and even solidified by the application of great pressure combined with an extremely low temp. (see LIQUID GASES). Compressed A. is used as a curative agent (see AEROTHERAPEUTICS), as an explosive or propellant (see AIR-GUN), as a dielectric in a form of Leyden jar (q.v.), and as a motive power in various forms of machinery, such as the boring machines used in tunnelling through the Alps and elsewhere (see TUNNELLING).

**Air-balloon**, a term sometimes applied to balloons filled with hydrogen or coal-

gas. The use of such a term owes its origin probably to the fact that the first balloons were distended by means of heated air.

**Air-bath**, an oven heated by gas or steam, used in practical chem. for removing water from a substance.

**Air-bed**, a bed consisting of an envelope of rubber fabric distended with air. The bed is usually divided into compartments, into each of which air is pumped through a valve. When deflated, the bed can be folded up, so that it provides a portable as well as sanitary form of sleeping accommodation.

**Air-bladder**, or **Swimming-bladder**, a structure in some fishes which is filled with gas and serves as an organ of flotation. It occurs in the position occupied in air-breathers by the lungs, but is in most instances developed dorsally from the fore-gut, whereas the lungs are a ventral outgrowth. It is usually connected with the pharynx or the gullet by a duct, and therefore probably performs the duties of an accessory respiratory organ. It has been found that in a perch asphyxiated in stagnant water, the oxygen of the A. has been entirely replaced by nitrogen and carbon dioxide, although the normal proportion of oxygen is from 20 to 25 per cent. In some fishes the pneumatic duct is atrophied, so that the A. becomes a closed sac, whose function is entirely hydrostatic, that is, it serves to keep the sp. gr. of the fish the same as that of the water. The gases in the bladder are compressed or rarefied as the fish is subjected to greater or less pressure by its varying position with respect to the surface, and the quantity of gas is regulated by absorption or secretion, so that the sp. gr. of the whole fish is properly adjusted. In some instances there is a connection between the A. and the auditory organ, probably giving the fish a consciousness of the variations of pressure.

**Air-brake**, a contrivance to decrease the speed of a train, or to bring it to rest completely, by the use of compressed air. In the simplest form of the Westinghouse A., a steam-driven air-pump compresses air into a reservoir placed under the foot-plate of the locomotive. The reservoir is connected by a 3-way cock with the cylinder and piston actuating the brake-shoes in each coach throughout the train, the coaches being joined by flexible tubing. The brake is operated by turning the 3-way cock so as to allow the compressed air from the reservoir to act on the side of each cylinder necessary to drive the brake-shoes on to the wheels. The brakes are taken off by admitting compressed air to the other side of the cylinder. The improved form now in use has an auxiliary reservoir attached to each brake cylinder, with a triple valve connecting with the train-pipe. While the train is running the triple valve operates so that there is open connection between the train-pipe and the auxiliary reservoir and between the train-pipe and the brake side of the piston, whilst

the compressed air is shut off from the cylinder. Any sudden diminution of the pressure in the train-pipe causes the triple valve to shut off the auxiliary reservoir from the train-pipe and discharge its compressed air into the cylinder, so that the brakes are applied. Thus, if by the parting of any coupling or by any other breakdown in the apparatus the air in the train-pipe escapes, the train is automatically stopped, as well as by the deliberate action of the guard or driver. The brakes are released by admitting the compressed air from the main reservoir to the train-pipe, by which action the valve operates so as to admit compressed air to the brake side of the piston, at the same time re-establishing the connection between the train-pipe and auxiliary reservoir, which is therefore recharged.

**Air-chambers**, in plants, are cavities in the leaves or stems, or other parts, containing air. They are present in the parenchymatous tissue at the angles of adjoining cells. They are particularly noticeable in aquatic plants, e.g. white water-lily (*Nymphaea alba*).

**Air Council**. Estab. by the Air Force (Constitution) Act, 1917, to administer the R.A.F., to organise the defence of the realm by air, and to control civil aviation. It consists of one of the prin. secretaries of state, who is president; 1 pail. under-secretary of state, who is vice-president of the council, a chief of the air staff and senior air member of the council; air members respectively for personnel, supply and organisation, and training; the vice chief of the air staff; 3 additional members; and the permanent under-secretary of state. For some years the secretary of state for war acted as Air Minister, but a secretary of state for air was appointed independently of any other secretariat.

**Aircraft Carrier**. An armed vessel of the R.N., designed to carry aircraft and provide facilities for air operations while at sea. Article 4 of the London Naval Treaty, 1930, includes in the term any service vessel designed for the exclusive purpose of carrying aircraft and limited the tonnage of an A. C. to 27,000, but in view of Hitler's denunciation of the Anglo-Ger. Naval Agreement this, and indeed any other limitation on naval construction, ceased to be operative. Battleships and cruisers equipped with catapults for launching aeroplanes are to be distinguished from A. Cs. proper. At the beginning of the Second World War in 1939 the Brit. Empire had 8 A. Cs. of a total displacement of 126,000 tons and 7 'building and authorised' of a total displacement of 138,000 tons. The totals for other powers were: France, 2 with a displacement of 32,000 tons and 2 under construction of 36,000 tons total displacement; Germany, 2 under construction (39,000 tons total displacement); Japan, 11 (147,000 tons) and 2 (25,000 tons); Russia, 1 (9,000 tons) and 2 (24,000 tons); and U.S.A., 5 (120,000 tons) and 2 (35,000 tons). The

famous *Ark Royal* was a vessel of 23,000 tons with 16 4.5-in. guns. She was torpedoed and sunk in the Mediterranean E. of Gibraltar in 1941 (see *ARK ROYAL*). The *Courageous* (22,500 tons) and the sister ship *Glorious*, carried 16 4.7-in. guns. The *Courageous* was originally completed as a cruiser in 1917 but was converted between 1924 and 1928 and re-fitted in 1936. She also was torpedoed and sunk, Sept. 17, 1939, 515 men being lost. The *Glorious* was sunk off Norway in June 1940. Other A. Cs. are (1942) the *Hermes* (10,850 tons, 6 5.5-in. guns),



Central News

AIRCRAFT CARRIER, H.M.S. 'ILLUSTRIOUS'

sunk by the Jap. off Ceylon, in Apr. 1912; *Furious* (22,430 tons with 10 5.5-in. guns),  *Eagle* (22,600 tons, 9 6-in. and 4 4-in. guns), and the *Argus*, a training A. C. of 14,450 tons with 4 3-pounders. The Brit. A. C. *Illustrious* (23,000 tons), completed after the outbreak of war, rendered great service on Nov. 11, 1940, at the victory of Taranto, which restored naval supremacy in the Mediterranean to the Brit. Fleet, for the striking forces were naval aircraft flown from the carrier. On Jan. 10, 1941, the *Illustrious*, while conveying ships to Greece, was heavily attacked in the Central Mediterranean by 15 Junkers dive-bombers, and hit with a 1000-lb. bomb below the bridge, but, though shaken from stem to stern, she reached port safely. In the Guadalcanal campaign (Aug. 1942) the crucial campaign of the Pacific in the war against Japan, 3 A. Cs. formed part of the task

force' (independent tactical unit) which covered the Amer. landings, but were withdrawn as soon as possible owing to fear of a Jap. land-based air attack. There were, however, A. C. engagements off the E. Solomons (Aug. 23-25) and the Santa Cruz Is. (Oct. 26), in the latter of which the *Hornet* was sunk, leaving the damaged *Enterprise* the only allied A. C. in the Pacific, the *Wasp* having been sunk by submarine in Sept. But by Feb. 1943 the U.S.A. sent 5 more A. Cs. to the Pacific. After the lessons of Guadalcanal the attrition tactics were replaced by the adoption of the principle of achieving decided command of the sea by building up much larger task forces, and in this strategy the A. C. played its part. Until the series of operations which began at Tarawa, the A. C. had been used in small numbers, and regarded merely as a means of making planes available to surface ships as a protection for them when beyond easy reach of their own land-based aircraft. But the offensive successes of the Amer. A. C. in Feb.-Mar. 1942, at the Marshalls, Rabaul, Wake, Lae, and Salamaua showed the Amer. Naval Command what were the real potentialities of the carrier, and the result was an accelerated and expanded programme which bore fruit towards the end of 1943. For once the Amers. began to use carriers in large groups it became evident that their Navy had incorporated within itself the only truly mobile air force of any size in the world, an air force in which both the aircraft and their floating bases were capable of rapid movement and of achieving surprise; while Amer. naval fighter planes operating from A. Cs. proved tactically superior to the best land-based planes which the Jap. could send against them. The popular doctrine that carrier-borne air forces should not be opposed to land-based air forces because the floating base could be sunk was largely overcome by the very fact of concentration, which gave the Amer. task fleets air forces large enough to repel dangerous concentrations of enemy planes. In the Okinawa campaign over a 2-month period 8 large carriers, 2 light carriers, and 3 escort carriers were damaged, most of them by the Jap. *kamikaze* (suicide planes), a salutary reminder to the Amer. Navy that tactical problems are never solved conclusively. The *Eagle* A. C. was launched on Mar. 19, 1946. She is the biggest A. C. in the world. See also AERODROME.

**Air-engine**, a form of heat-engine in which the working substance is air. The essential parts of such an engine consist of a chamber placed so that one end can be heated by a furnace and the other cooled by a refrigerator. When hot the air is allowed to expand to push a piston; when cooled it is compressed to its original vol. by pushing a piston back. The difference between the work done by the hot air in pushing the piston and that done upon the engine by pushing the piston back is the net work done by the engine. Carnot imagined an engine in

which a vol.,  $V$ , of air at a low temp.,  $T_1$ , was compressed until its temp. rose to  $t$  and its vol. was reduced to  $v$ . It was then placed in contact with a source of heat whose temp. was also  $t$  and allowed to expand whilst its temp. remained constant; it was therefore necessary that heat should be abstracted from the source to account for the expansion. The air was then removed from the source and allowed to expand until its temp. fell to the original temp.  $T_1$ . It was then placed in contact with a refrigerator of the same temp.  $T_1$ , and compressed to its original vol., the temp. remaining constant, which means that a quantity of heat must be given out to the refrigerator. This was merely a theoretical engine, in which the difference between the quantity of heat taken from the source and that given up to the refrigerator indicated the amount of work done by the engine.

This principle was adopted by the Rev. R. Stirling, who invented in 1816 an A. in which a large plunger works in a cylinder, with a space at the top kept cool by a water-jacket, and a space at the bottom heated by a furnace. The distinctive feature of the engine is the 'regenerator,' a structure of thin metal plates or wire gauze, which connects the cold upper region with the hot lower region, so that the hot air in ascending may give out heat which may be taken in by the cold air in descending, thus supplementing the furnace and economising fuel. When the plunger is raised the cold air is forced through the regenerator to the bottom of the engine, becoming heated, and exerting pressure which serves to raise a motor piston. The plunger then falls: the heated air is forced up to the cold region, the pressure diminishes, and the motor piston falls. The whole work done by the engine is the difference between the work done by the motor piston and that required to move the plunger. The theoretical efficiency of such an engine is high, but in practice it does not work out so satisfactorily. A double-acting engine of a somewhat improved type, the result of the collaboration of Robert Stirling with his brother James, was installed in the factory of the Dundee Foundry Company, where it was used for about 3 years; but repeated difficulties connected with the heating vessels eventually caused its abandonment.

In 1853 an Amer., Capt. John Ericsson, fitted his ship, the *Caloric*, with an A. He used a regenerator, but experienced the same difficulties as his predecessors, and abandoned the attempt after 2 years' trial.

The more marked disadvantages of As. on the Stirling model are the great bulk of air used in engines of quite small power and the difficulty of transmitting heat to it. The surface to be heated is too large, there is great waste of heat through the chimney, and there is constant oxidation of the metallic envelope, owing to its being at a high temp. in contact with free oxygen.

Modern As. are usually of small power ;

they are, however, easy to work, and are especially suitable for pumping. Among them may be mentioned Messrs. Hayward and Tyler's 'Rider' hot-air engine. It has 2 cylinders and a regenerator consisting of thin iron plates. Coke is employed as fuel, and if the engine is used for pumping, the water may be utilised in the cooling-jacket. For a 1-h.p. engine the consumption of coke is about 9 lb. per hr. In the 'Bailey' engine there is 1 cylinder, in which both the motor piston and the plunger work. The engine is very simple in construction, and requires little attention in working. In a Fr. hot-air engine, the 'Bönler,' the air is first compressed by an air-pump and then driven through the incandescent fuel. A valve prevents the escape of the air during the ascent of the piston; it is then exhausted, a portion being blown into a small space surrounding the motor-cylinder, which tends to keep the cylinder and piston cool. This engine is made to give as much as 20 h.p.

**Air Force, Royal (R.A.F.).** This, the youngest of the three services, was constituted by Act of Parliament in 1917 by amalgamating the Royal Naval Air Service and the Royal Flying Corps, which last-named came into existence in 1912. These bodies were organised respectively by the Admiralty and the War Office, and rendered effective service during the First World War, but as from 1918 the amalgamated force was organised and controlled by the Air Ministry. The R.A.F. consists of the Royal Air Force, the Air Force Reserve, the Air Force Special Reserve, the Auxiliary Air Force, the Auxiliary Air Force Reserve, the Royal Air Force Regiment, the Royal Air Force Volunteer Reserve (numbering 5000 during Second World War), the Women's Royal Air Force (W.R.A.F.), formed in 1941, Princess Mary's R.A.F. Nursing Service, and the Air Training Corps. The Fleet Air Arm was transferred to the Royal Navy in 1937. The R.A.F. during the Second World War was organised into the Air Defence of Great Britain and the Overseas Commands and Air H.Q. The Air Defence of Great Britain during the war was divided into Commands as follows: the Bomber Command (q.v.) (h.q. High Wycombe); Fighter Command (h.q. Stanmore); Coastal Command (h.q. Northwood); Flying Training Command (h.q. Reading); Maintenance Command (h.q. Andover); Technical Command (h.q. Reading); Transport Command (h.q. Teddington), estab. in 1943 to collaborate with B.O.A.C.; and N. Ireland Command (h.q. Belfast). (Overseas) Mediterranean and Middle E. Command (h.q. Caserta and Cairo); Middle E. Command (h.q. Cairo); Air H.Q. at the following stations: Malta, Greece (Athens), the Levant (Jerusalem), Iraq and Persia (Habbaniya), Aden, E. Africa (Nairobi), E. Mediterranean (Alexandria), Egypt (Cairo), India (New Delhi), W. Africa (Accra), Burma (Calcutta); and the Air Command of S.E. Asia (h.q. Kandy).

Prior to the Jap. invasion of Brit. Malaya there was a Far-E. Command based on Singapore. Areas are subdivided into groups and wings, each containing a certain number of squadrons. In 1938 the strength of the Metropolitan Air Force was 123 squadrons, organised into 68 bomber, 30 fighter, 15 reconnaissance, and 10 Army co-operation squadrons. Twenty-seven squadrons were serving overseas. These strengths, however, were soon augmented in view of the international crisis of 1938-39, and of course augmented again beyond measure during the war.

Under the Brit. Commonwealth Air Training Plan (announced Dec. 10, 1939) provision was made for the training of 20,000 pilots a year, besides men for ground duties. Under this plan men from Britain, the Dominions, and other parts of the Empire were trained in Canada. Later the plan became the Combined Training Organisation, and was only terminated on Mar. 31, 1945. Provision was made for 93 training schools covering every aspect of air force work, and 60 new airfields. Special training was demanded by the complex character of air operations. Staffs for the flying schools necessitated highly skilled flying instructors and officers of administration, equipment, wireless engineering, and armament, as well as operators, instructors, and armourers, each of whom required special training in specially equipped schools. Provision had to be made also for the training of mechanics to do the work of overhauling and repairing the aircraft used by pilot pupils. Recruits in training depots received a general introduction to air force work. The next stage, in the initial training schools, was occupied in a 5-weeks' course in air-force law, mathematics, flight theory, mechanics, air armament, and physical training. After this the recruits were divided into 3 groups as pilots, observers, and wireless-operator air gunners. Pilots began in the elementary flying training schools with 7 weeks' instruction in the ground school and in the air. This was followed by 10 weeks with intermediate and advanced training squadrons, flying service types of aircraft. Some types of these schools concentrated on instruction in piloting fighter planes and others on training bomber pilots. Observers, who chart the course of a plane and aim the bombs on raids, spent 14 weeks at an observers' school learning air navigation, aerial photography, and reconnaissance duties, such as sketching, observation, and spotting enemy positions and concentrations, following this with 6 weeks at the bombing and gunnery school for special training in the use of bomb-sighting devices, as well as the handling of machine guns, and ending with 4 weeks in the bombing and gunnery school concentrated on the use of machine guns and training in repairing them. After the completion of this training the 3 groups formed an air-crew pool, from which some were chosen as instructors

and the rest assembled at embarkation depots. Once overseas, they received operational training preparatory to active service.

Under the regulations in operation before 1939 permanent commissions in the R.A.F. may be obtained either (i) through the R.A.F. (Cadet) College at Cranwell, or (ii) through a recognised univ., and temporary commissions by direct grant of what is known as a 'short-service' commission. A limited number of short-service officers are selected periodically for transfer to permanent commissions. The cadets' course at Cranwell lasts for 2 years, during which time cadets are taught to fly. All cadets who successfully pass out of Cranwell receive permanent commissions, commencing with the rank of Pilot Officer. Promotion to Flying Officer comes normally after about 20 months' service, and promotion to all ranks above Flying Officer is made by selection. Univ. candidates are gazetted to Pilot Officer rank with 12 months' seniority or 18 months if the candidate graduated with first-class honours, and promotion to Flying Officer follows in 6 months. Officers were given the opportunity of studying some branch of engineering or science that has its counterpart in civil life. By this means an officer avoided the risk of becoming so far a specialist in the science of aerial warfare as to be unfitted for any civil avocation on retirement from the force. During the war training in the R.A.F. attained so high a pitch of specialisation that many of its officers and men were necessarily trained in some branch of science. The other chief educational establishment is the Staff College at Andover. The chief pre-war training depot was at Halton. There were also 3 flying training schools, 1 central flying school, and schools of gunnery, ballooning, army co-operation, photography, and wireless.

The establishment for 1939-40 was 100,000, exclusive of those serving in India, which were paid for by the Govt. of India. This figure was augmented in the subsequent years of the war until in 1945 it reached over 150,000 flying officers, air gunners, wireless operators, flight engineers, navigators, navigation instructors, signallers, and armament, airfield construction, and balloon personnel. Units are made up of squadrons, groups, and wings. A single-engine squadron comprises 3 'flights' of 4 machines each (peace establishment) or 3 'flights' of 6 machines (war establishment). A twin-engine squadron consists of 2 'flights' of 5 machines each. 'Group' is practically synonymous with 'wing', but 'wing' is rather a wartime term denoting 2 or more squadrons, whereas 'group' is a peace organisation, larger than 'wing' in the sense that it comprises it; auxiliaries in the way of training schools as well as its service squadrons. A 'brigade,' also a wartime term, comprises 2 or more wings, or at least 4 squadrons, i.e. 48 machines (peace) and 72 (war).

In 1938 Great Britain had 104 regular and 19 auxiliary squadrons. Besides these there were 8 squadrons in India, 5 in Iraq, 7 in the Middle East, 1 in Aden, 4 in the Far E., and 1 in the Mediterranean. In 1939 there were 30 squadrons overseas, and 7 additional squadrons were in process of formation, so as to bring up the overseas strength to 500 front-line aircraft. This strength was greatly exceeded subsequently, as is shown by the fact that at the height of the bombing operations over Germany, the loss in 10 months during 1943-44 was 2500 aircraft or 18,000 men killed or taken prisoner, while the total casualties of the R.A.F. in the war were 112,296. The R.A.F. has 4 main classes of aircraft: bombers, fighters, bomber-transport machines, and fighter bombers.

The total number of machines in the R.A.F., including reserves, at the end of 1934, was only 1434; the total establishment being then 1500. Thus, at that date, Great Britain's A.F. was, numerically, inferior to those of France, U.S.A., Russia, Japan, and Italy; though Great Britain had a greater strength of trained flying personnel and a greater total strength of aircraft, including reserves, than any other country. In 1939 the first-line aircraft at home numbered 1750, and there were good prospects that the programme for the Metropolitan Air Force of approximately 2370 would be completed by 1940. In the 5 years 1939-44 Brit. aircraft production reached 10,000 heavy bombers, 17,700 light bombers, 38,000 fighter planes, and 40,000 other machines. Among the many V.C. awards to members of the R.A.F. were: F/O. Donald E. Garland (Belgium, 1940), W/C. A. B. Learoyd (Dortmund-Ems Canal, 1940), F./Sgt. John Hanna (1940), W/C. J. B. Nicholson (over Southampton, 1940), G/C. H. Edwards (Bremen, 1941), F/O. K. Campbell (Brest, 1941), F/O. L. T. Manser (Cologne, 1942), W/C. H. G. Malcolm (Tunisia, 1942), F./Sgt. Lt. H. Middleton (Turin, 1942), W/C. G. P. Gibson (Kuhir Dams, 1943), F./Sgt. A. Aaron (Turin, 1943), F./Sgt. W. Reid (Düsseldorf, 1943), P/O. C. J. Barton (Nuremberg, 1944), F/O. J. A. Cruickshank (anti-submarine, 1944), and W/C. G. L. Cheshire (Pathfinder, 1944).

See also AERIAL WARFARE: AIR RAIDS.

**Air-gun**, a gun in which the bullet is propelled by the energy of compressed air. There are many forms, but usually there is an air reservoir communicating with the barrel, which should be of small bore. The air is compressed by means of a spring, the trigger operates the valve, and the bullet is thereupon propelled by the elasticity of the compressed air. Most A.s. are capable of carrying a small bullet for a distance of about 60 to 80 yds.

The use of compressed air as a propellant in larger pieces of artillery has received much attention in America. In 1888 Capt. Zalinski, of the U.S. Artillery, introduced an effective pneumatic gun, from which shells charged with dynamite were propelled by air at 1000 lb. pressure, a store of which is carried in reservoirs



attached to the gun. With a 1000-lb. shell the gun has a range of 2400 yds., and great accuracy has been obtained in guns mounted ashore. The shore defences of New York and San Francisco include some of these guns, their great advantage being that the shells can be timed to explode under water. An attempt was made to use them on a gunboat in the Sp.-Amer. war, but without any striking success.

**Air-lock**, a chamber connecting the region of compressed air of a caisson (*q.v.*) with the outer atmosphere. When the outer door is opened to admit men or materials the air is at atmospheric pressure. The outer door is then shut and air pumped into the lock until the pressure is equal to that of the caisson, when the inner door is opened.

**Air Mail**. A. M. is entirely a post-1918 development, apart from a temporary service between Hendon and Windsor, operated in 1911. A regular service between London and Paris was estab. in Nov. 1919, which was operated by Aircraft Transport and Travel, using an Aéro 'D. H.' type of plane. The initial rate of charge was 2s. 6d. per oz., but this was soon reduced to 2d. In 1920 the service was extended to Brussels and Amsterdam, and 2 years later the Paris service included parcel post. Then followed daily services to Paris, Brussels, Stockholm, and Basle in summer time, while Rome was on the Europe route. Plans in preparation shortly before the Second World War covered every European cap. in the network of the Brit. A. M. services. A. M. service between Egypt and Iraq was operated by the R.A.F. in 1921, but in 1927 this service was transferred to Imperial Airways Ltd. (*q.v.*). In Mar. 1929 the Egypt-Iraq service was included in the newly inaugurated London-Karachi route via Italy, Greece, Egypt, and Iraq. Soon afterwards the Indian service was continued from Karachi to Lahore and also to Bombay and Madras, and then across India via Delhi and Calcutta through Siam to Singapore. In 1933 a further extension was made through Java to Port Darwin (Australia), and thence to Perth, and also a transcontinental service was begun to Sydney and Brisbane. In the following year Imperial Airways announced the preparation of a 7-8-day service to Australia. The other long-distance Empire route, the 8000-m. route from London to Cape Town, was opened in 1932. A trans-Atlantic A. M. service, connecting with the airway system of Canada, and a trans-Pacific service were then projected, and test flights were carried out in 1938 and 1939 between England and Port Botwood (Newfoundland) by seaplanes (as opposed to flying-boats, which it was planned to use later in conjunction with land planes for feeder services). Between 1924 and 1938 the Brit. A. M. increased from 100,000 letters to many millions annually. The aggregate weights of letters sent by A. M. for the years 1935-37 were, respectively, 419,100 lb.,

765,500 lb., and 1,490,900 lb.; while Empire services in 1937 totalled 670,000 lb.

The U.S. Gov. A. M. service is extensive, and unity of control over a continent has long given that Gov. advantages that have ensured progressive continuity of development. A day and night A. M. service operates between New York, Chicago, and San Francisco. Another long-distance foreign A. M. service before 1939 was the Fr. air-line to Brazil and the Argentine via Morocco and Dakar (W. Africa).

An international A. M. conference in 1927 resulted in a standardised route and a uniform practice generally. The Brit. Gov., the Union Gov. of S. Africa, and the Portuguese Gov. in 1935 arranged a bi-weekly service in each direction between England and S. Africa. This service was operated by flying-boats via Egypt and the Sudan to Kisumu and thence, via Mombasa, Dar es-Salaam, Beira, and Lourenço Marques to Durban. The boats were capable of a maximum speed of over 180 m.p.h., and a cruising speed of 150 m.p.h. Land planes also operated branch services connecting Kenya, Tanganyika Ter. and N. Rhodesia with the main service; and a branch service from Beira linked up N. Rhodesia and Nyasaland.

Before 1939 the development of New Zealand-Australian services was under consideration. A trans-Pacific project was in hand as also a service to the W. Indies. The scheme of development of empire air communications, as announced by the Air Ministry at the end of 1934, contemplated a schedule of 2 days to India, 2½ days to E. Africa, 4 days to the Cape, 4 days to Singapore, and 7 days to Australia.

Developments in aircraft construction during the war in 1939-45, and since then, have greatly reduced these scheduled times, besides making the trans-Atlantic A. M. a common feature. *See further under AVIATION, CIVIL.*

Information on A. Ms. to countries abroad is given in the current A. M. Leaflet, which may be obtained gratis at any post office or, by telephone, from the London Postal Enquiry Office; while local times of posting may be ascertained from the nearest head or branch post office. There are 2 kinds of Letter A. Ms.: (i) 'All-up' services, in which letters and post cards are sent by air at ordinary postage rates. Such correspondence should be posted in ordinary letter-boxes and not bear 'A. M.' label or markings; (ii) 'Surcharge' services, in which higher charges are made. The special blue A. M. label—or the words 'By Air Mail'—should appear in the top left-hand corner of each mail packet. Registration (but not insurance), express delivery, and the green-label system are in force, as well as the usual limits of size and weight. As to parcel A. Ms., the general parcel regulations apply; the special blue A. M. label must be affixed to the dispatch note close to the address, and the words 'Air Mail' should also be written on the cover, and postage must be prepaid.

The leading international lines are Brit. Overseas Airways Corporation; Air France; Pan-Am. Airways; K.L.M. (Royal Dutch Lines).

**Air Ministry.** The ministry formed to administer the R.A.F. (q.v.) through the Air Council (q.v.). It is modelled somewhat on the organisation of the War Office, with depts. under each of the prin. members of the Air Council. For purposes of recruiting and organisation there were in 1938 5 Area Commands under its control; the Northern, Midland, Southern, Western, and Scottish, with headquarters, respectively, at Catterick, Grantham, Stanmore, Gloucester, and Edinburgh. The enormous increase of the R.A.F. during the Second World War, coupled with the rapid completion of numbers of new aerodromes and the training of thousands of air personnel in Canada under the Air Training Scheme entirely transformed the organisation of air commands in Britain. The A. M.'s depts. include a meteorological office; scientific adviser's dept.; directorates of signals, armaments, operations, navigation, accident prevention, intelligence (research, technical, etc.), plans, policy, operational training, equipment, engineering, technical training and radio; and personnel branches.

**Air-pump,** a machine for diminishing or increasing the amount of air in a contained space. The term was originally applied to contrivances for producing a partial vacuum, but is now used without discrimination in connection with machines for producing a flow of air. The mechanism which provides a diver with a constant supply of air at a pressure proportionate to his depth in the water is called an A., and the term is also applied to machinery whose object is to provide a supply of compressed air.

The earliest device for exhausting air by means of a pump is associated with the name of Otto von Guericke. In 1650 he devised an apparatus for removing air from a vessel, called a receiver, which is connected with a barrel in which a piston works. Both the connecting pipe and the piston are fitted with valves opening away from the receiver. As the piston is pushed in, its valve opens and lets out the air contained between it and the valve at the bottom of the barrel. When the piston is withdrawn, its own valve shuts, and the other valve opens to allow the air of the receiver to extend into the barrel. The air thus becomes more rarefied at each stroke. Pumps on the Guericke model do not reach a high level of efficiency. The difficulty of working increases as the difference of pressure within and without the receiver increases; there is usually constant leakage at the valves, and when the process of exhaustion has reached a certain point, the pressure of the air left in the receiver is not sufficient to open the valves. An improvement was instituted by Papin and Hawksbee, who used a pump with 2 barrels, thus shortening the process of exhaustion. In Hawksbee's A. each piston is worked by a rack

and pinion, and owing to the fact that one piston works with the pressure of the atmosphere as the other works against it, the difficulty of working as exhaustion proceeds is not increased.

In Tate's A. there is a single barrel with a double action, the piston consisting of 2 disks joined together, forming essentially a piston just less than half the length of the cylinder. There is an outward-opening valve at each end of the cylinder, and the inlet is in the middle, so that air is expelled by both the forward and backward strokes of the piston.

A pressure gauge is usually attached to these pumps, consisting of a bent glass tube containing mercury, one end of which is closed, thus forming a kind of barometer. The closed portion, however, need not be 30 in. long, as it is seldom necessary to know the pressure inside the receiver until it is considerably less than that of the atmosphere.

The progress that has been made in modern electrical research and in its practical applications during the last 30 years has only been made possible by an enormous improvement in the design and technique of A. The modern 'high-vacuum' pump is capable of producing a pressure as low as a thousand-millionth of an atmosphere, which is the order of the pressure in a wireless valve and the modern Coolidge X-ray bulb. There are 2 types of such pumps: (1) the Gaede or molecular pump, (2) the Langmuir or mercury vapour pump.

The principle of the former is as follows: Inside a fixed cylinder there is mounted a concentric cylinder of a diameter only slightly less than the outer one. The latter cylinder can be rotated very rapidly about its axis by means of an electric motor. In the outer cylinder there are 2 outlets, one (A) communicating with the vessel to be evacuated, and the other (B) connected to a low-pressure chamber, i.e. one in which the pressure has been reduced to about  $10^{-6}$  of an atmosphere by means of an ordinary A. The movable cylinder rotates from A to B, and as its periphery is moving with a high velocity, comparable with that of the molecules, a one-way molecular traffic is set up in the direction from A to B, and the pressure in the vessel connected to A decreases very rapidly to the extremely low value mentioned above. It may be recalled that in the common filter pump a stream of water rushes past an outlet and drags the air from the tube connected to the funnel containing the liquid to be filtered. Langmuir's pump ingeniously adopts this principle, but with this difference: the stream is a stream of mercury vapour from mercury boiled under reduced pressure, and it rushes past an outlet connected to the vessel to be evacuated, thus dragging molecules of the air along with it. The stream of mercury vapour and air is then immediately cooled; the mercury condenses and returns as liquid mercury to the boiling chamber and the

air passes on to be carried away by an ordinary A. The efficiency of both these pumps, especially the latter, is truly remarkable.

**Air-Raid Precautions (A.R.P.).** Precautions against air raids on the civil population in a future war were ignored for the better part of 2 decades after the First World War. Undue confidence was reposed in the principle of collective security, and war-weariness seemed to postpone another Armageddon to the Gk. Kalends. But the devastating effects of aerial warfare on civilians were exemplified in the Italo-Abyssinian war of 1935-36, in the Jap. invasion of China in 1937-38, and in the Sp. Civil war of 1936-39; and with the increasing tension in the European political situation from 1937, public consciousness of the danger was awakened and by 1938 most countries had developed protective measures against explosive and incendiary bombs and gas attacks from the air.

In the United Kingdom the Air-Raid Precautions Act was passed at the end of 1937. The preparation of schemes for the protection of the civil population is the business of the Home Office working in conjunction with the local authorities. A.R.P. took the form of a free issue of gas masks to the entire pop., the provision of bomb-proof shelters, the formation of decontamination squads to deal with mustard or other liquid gases in the streets, instructions on the way to render refuge rooms gas-proof and the preparation of special fire-fighting apparatus. London, with its vast pop. and congested areas, presented peculiar difficulties, and plans were soon completed for at least a partial evacuation of the pop. Sound-detectors were perfected for warning the country of the approach of enemy aircraft and experiments with balloon wire-burriages were carried out. Fighter planes and anti-aircraft guns necessarily played a large part in resisting raiders during the Second World War as well also as counter-bombing raids on enemy soil. 'Blacking-out' experiments were made before the war (1939) in various towns, combined with fire-fighting and gas-decontamination practice.

But in spite of progress in the planning of civil defence, the vulnerability of ordinary citizens living and going about their business in crowded urban areas was and is still the potential Achilles' heel in time of war. Among precautions to meet this danger are splinter- and blast-proof shelters, the strengthening of basement in certain types of houses and the provision of communal and street shelters. The protection of works, offices, and public utility undertakings is covered by statute, but much remained to be carried out in practice. After the Second World War had been in progress for over a year, London's bitter experience of Ger. air-raids demonstrated the absolute necessity of a 'fire-watching' organisation. Had the efficient arrangements which were subsequently made been in operation earlier, millions of pounds' worth of property might well

have been saved from the devastation by incendiary bombs, especially in the raid of Dec. 1940. Thus, early in the hist. of air warfare on open cities, A.R.P. was necessarily of an improvised character. Sometimes, as in the case of the rock shelters of Malta, nature has provided a merciful means of protection. Again, in Hong Kong, the shelters were admirable. But experience suggests that in future wars, when the weight of bombs and bombers will be increased beyond measure, to say nothing of the development of the atomic bomb, A.R.P. of an altogether revolutionary and all-embracing character will become the first duty of the govs. of all states.

**Air Raids. First World War.**—The inviolability of the shores of Great Britain guaranteed by the supremacy of the seas was to a limited extent disturbed in the First World War by enemy attacks from the air. A few attacks were made in 1914. In 1915 Ger. airships of the Zeppelin type raided Norfolk, Northumberland, Essex, Suffolk, Yorks, E. London, and the home cos. The attacks were repeated in 1916 and extended to the midland cos., as well as to Lincs, Leicester, Durham, Cambs, Hunts, Notts, and as far W. as Cheshire and as far N. as Scotland. In 1917 and 1918 airship raids were very rare, and ceased altogether after Apr. 1918, the losses sustained by the raiders rendering such mode of attack abortive. Some Ger. airships were brought down in flames in England, and in Oct. 1917 only 4 out of 11 returned safely to Germany, the other 7 being wrecked over France and the Mediterranean. The number of airship raids were approximately 50, and according to the best available estimates the casualties among civilians in killed were: 217 men, 171 women, 110 children; the injured numbered 587, 431, and 218 respectively. Fifty-eight sailors and soldiers were killed and 121 injured.

Ger. aeroplane raids began in Dec. 1914, over Dover and other parts of Kent. There were 4 raids over the E. cos. in 1915, 16 over E. and home cos. in 1916, 27 over E. and home cos. and London in 1917, 8 in 1918, mainly over Kent, Essex, and London, the last being in June over Kent. The total casualties from these A. R. were: among civilians, killed, 282 men, 195 women, 142 children; injured, 741, 585, and 324 respectively; military personnel 238 killed and 400 injured. No co. was more raided than Kent, though Essex suffered severely. No fewer than 213 civilians were killed and 615 injured in 2 raids over Margate, Essex, and London on June 13 and July 7, 1917. By 1918 the R.A.F. had estab. a definite superiority over raiders, and this fact, combined with the pressure on the W. front, which necessitated the retention of Ger. machines over the lines, caused these raids to cease altogether nearly 5 months before the end of hostilities. The last A. R. on London was on May 19, 1918, this being the twenty-fifth raid on the cap., the

prin. damage during the whole period being done in Bethnal Green, Peckham, Lewisham, Lower Sydenham, Kilburn, Rotherhithe, City, and Poplar. In the City the most disastrous raid was that in which explosive bombs were dropped on the Central Telegraph Office. For the rest anti-aircraft guns and defensive planes kept the raiders too high to permit of damage to railway centres or points of military importance. Many bombs were dropped on Paris in the course of numerous raids, over 400 persons being killed and twice that number injured. In the first months of the First World War, the Allies only employed aircraft for reconnaissance work, for the direction of artillery fire, and for bombing the Zeppelin sheds of Düsseldorf or military positions. The Gers., however, initiated the policy of bombing open or undefended towns with the object of instilling terror into the inhab., but without any marked effect. By way of reprisal the Allies in the later stages of the war effected numerous raids into Germany, especially in the Rhine provs. Later, the R.A.F. organised and carried out raids of increasing intensity as far as Frankfurt and Stuttgart, and a great raid on Berlin would have been attempted but for the signing of the Armistice.

*Air Raids over Britain in Second World War.*—Daily A. R. on Britain began on June 18, 1940. General night attacks, but on no large scale, were meant to probe defences, and to make pilots familiar with the area. At the beginning of July daylight raids increased in strength, particularly against ports and shipping, suggesting that temporarily the enemy's purpose was not so much the destruction of Brit. air power as the tightening of the blockade, for airports and industrial plants were no longer the main targets. Southampton and Portsmouth were savagely raided, but attacks also ranged from E. Scotland all round the coast to the Bristol Channel. By the end of July the raids were increasing in intensity, but the numbers of hostile aircraft were still comparatively small. On Aug. 8 there was begun a series of mass daylight raids lasting a fortnight, the number of raiders rising ultimately to more than a thousand. These raids were still directed against ports and shipping, but attempts were also made to wreck airports and destroy defending planes. The battle of Britain (q.r.) showed, however, that the Gers. had no hope of conquering the R.A.F. by mass daylight raids. Damage had been fairly extensive in certain localities of London, but basic resources were not seriously impaired. At the end of Aug. it was evident that the Gers. had signally failed to crush the R.A.F. by direct assault on aerodromes and airports. Hence they were driven to indirect methods of attack, which Hitler pretended were in retaliation for the bombing of Berlin. The real motive for the mass assaults on London, which began on Sept. 7, was to paralyse a vital nerve centre by disrupting essential services. In the ensuing weeks London

suffered a bombardment from the air more severe than that of Rotterdam or Warsaw. The vast system of the London docks lay almost in ruins. Shops, residences, and utility services were seriously damaged, but the city's vital services continued to function and the morale of the people remained unbroken. The success of the R.A.F. fighter-pilots against the daylight bombers forced the Luftwaffe to change their tactics. The bombers now approached in solid formations with fighter-escorts in tiers above them or in mixed formations of fighters and bombers which spread out in the hope of scattering the defending planes before converging from different points and at different altitudes. But they continued to pay a heavy price, and sometimes lost a third of their raiding force. Of the 40 heavier raids by daylight between Sept. 5 and Oct. 6 about a score were directed at the London area. On Sept. 15 the Gers. made a supreme effort which proved to be the climax of their daylight raids, and the most triumphant day of all for the R.A.F. Five hundred Ger. bombers came over in 4 successive waves, but comparatively few penetrated the screen of Spitfires and Hurricanes to the city, and the Luftwaffe lost about 185 machines, and between Sept. 6 and Oct. 5 some 900 Ger. aircraft had been destroyed over Britain. The Gers. were now constrained to try to achieve their object by night raids, aided by parachute flares and incendiary bombs, and though they found it difficult to locate targets with any precision, their continuous bombing by mass assault wrought great havoc, especially in areas round the E. End docks. The defence now concentrated on a box-barrage, aided by new methods of prediction, and new combinations of searchlights and anti-aircraft fire. It still remained, however, to train fighter-pilots for night operations. But all these defences were still far short of giving immunity against the damaging effects of a protracted process of attrition. None the less the abandonment of *blitzkrieg* methods of air raiding meant that all hope of an immediate victory over Britain had gone, and the enemy now hoped by indiscriminate night bombing to demoralise the civilian pop., besides progressively destroying London or paralysing its commercial life. Occasionally they still sent over daylight raiders, but when they did so their losses always rose, and sometimes they tried daylight raids by fighter-bombers under cloud cover—'nuisance' raids, whose purpose was to increase the strain both on civilian morale and on the fighter-pilots of the R.A.F.

But if the damage to vital objectives was still a matter of chance the damage to London property generally was mounting in severity and extent. In Oct. London was still the main objective, but by the middle of that month there were scattered raids on provincial cities which sometimes bore the brunt of an attack. The failure to conquer England by destroying London had compelled the

enemy to turn his attention to the chief industrial areas, while periodically claiming that the raids were reprisals for R.A.F. raids. A full-scale attack on Britain being impracticable the Luftwaffe now tried the method of concentrating the maximum force on a single point of attack. Coventry was the victim of the first of these attacks. Some 500 planes bombed that city throughout the night of Nov. 14 with indiscriminate attacks, which destroyed the cathedral and the

his force. Severe as the raids were, the real test in the air lay in the future. The direct damage by A. R. to Britain was not so much a matter of spectacular destruction as of gradual attrition, and perhaps the most extensive damage to an important area in this sense was that done in the Sept. raids on the E. end of London when great quantities of food imports were destroyed. But the percentage of destruction of industrial plants remained small, and not one of the



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#### THE LONDON FIRE RAID OF DEC. 29, 1940

In the foreground is the spire of St. Bride's Church, and in the background the flame-enshrouded dome of St. Paul's Cathedral

centre of the city, but left industrial plant relatively untouched. This 'terror' raid was soon followed by similar attacks on other towns, though not on the same scale. Birmingham, Southampton, Bristol, Liverpool, Plymouth, and other towns were in turn the objectives of such concentrated raids several times. Sheffield experienced the first of a series of raids on Dec. 12. Manchester was raided on Dec. 22. But public morale was not shaken, and on Dec. 29 the Germans turned from high explosives to incendiaries. On that night thousands of incendiary bombs on the very heart of the city of London found its defenders unprepared, and many famous buildings were destroyed (see LONDON), and the disaster was paralleled only by the Great Fire of 1666. It was, however, significant that the raids were now always on a limited scale, the inference being that the enemy was still unwilling to use more than a fraction of

services upon which the life of the great cities depended had broken down entirely. The 'nuisance' raids of Oct. were probably intended to retard production by compelling workers to resort to their shelters, though this was offset to some extent by employing roof spotters. But inevitably there was some loss of efficiency through the disturbances in the normal routine of civil life. The demolition of dwellings, particularly in Coventry, Plymouth, and the river-side boroughs of E. London, also involved considerable inconvenience, especially as there was already a housing shortage. It was, therefore, true enough to say that the civilian, and particularly the London civilian, was in the front line. Air-raid wardens and the national fire-fighting services were repeatedly occupied in tasks of the most extreme danger, while the bulk of the population was exposed to perils which in past wars were experienced only

by the people whose land was actually suffering invasion. But the prospect of A. R. was foreseen by the Gov. before the war began. Besides air-raid precautions and an auxiliary fire service, adequate preparations were made for the care of raid casualties. Yet insufficient preparation was made for the contingency of homeless persons. Thus, in Poplar, where more than half the houses were hit, the rest centres could not shelter, clothe, or feed the 'bombed out'; and no efficient billeting organisation existed, while responsibility for various functions was distributed among many different local bodies. But at this time the chief problem was the provision of sufficient shelters, for which no real plans had been made either by the Gov. or by the local authorities. With the accommodation in the few deep public shelters utterly inadequate Londoners crowded into the tube stations to sleep in bunks on the platforms or on the stairs, while others sought refuge in warehouse basements. In these conditions the menace of disease was serious, especially as most shelters contained no heating installations. Some amelioration came with the provision of 'Anderson' shelters, and later by 'Morrison' indoor shelters; but Mr. Herbert Morrison (g.v.) continued generally to rely on dispersal through a combination of evacuation to safer dists. and surface shelters, and this, in the circumstances, was no doubt the most effective remedy. Throughout these months of the greatest strain the patience of the mass of the pop. was beyond praise, and indeed the spirit of the Brit. people remained prepared to endure whatever burdens the war might inflict, confident always in ultimate victory.

There was a lull in A. R. over Britain for some 6 weeks between Jan. and the beginning of Mar. (1941) owing to the fact that Ger. air activity was now subordinate to the U-boat warfare. In this connection large-scale A. R. were resumed, in Mar. 1941, against the areas of Brit. ports in the hope of dislocating their functions as such. This time the long-range Ger. bombers struck as far N. as Glasgow and the Clyde-side, where the mass technique tried out at Coventry was combined with that of the incendiary attack on London. The effect of these raids was to some extent diminished by the fact that fire-watching had been made a compulsory duty, and that the night-fighter defence and anti-aircraft technique had both been much improved. Considerable damage was, however, done to Plymouth, Southampton, Bristol, Cardiff, and Swansea, though none of these cities suffered the prolonged ordeal of London during the autumn of 1940, and in any case the Luftwaffe still lacked the resources to strike more than one major blow in a single night or on 2 successive nights. From Apr. to June 1941 the Luftwaffe persistently attacked the chief seaports on the W. coast through which Amer. supplies must come, and sometimes they bombed E. coast towns, notably Newcastle and Hull. Some of the ports were

heavily damaged, and made practically uninhabitable, though none was knocked out completely. The 3-day raiding of Plymouth on Apr. 21-23 sent a great number of the inhab. out into the open countryside, and after sev. more raids before the end of Apr. the state of Plymouth was even worse than that of Coventry. Portsmouth suffered a similar though less severe experience. Bristol's worst raid was on Apr. 11. Belfast was twice heavily raided in the same month. Liverpool was raided on May 2, and for a week thereafter; yet despite widespread damage the port did not cease to function. The inland industrial cities were also intermittently attacked; Coventry again on Apr. 8, Birmingham on the succeeding night. London had one of its most savage attacks of all on Apr. 16, a dusk-to-dawn visitation which was only exceeded in ferocity by the raid on the night of May 10 when the roof of the House of Commons was demolished (see LONDON). Manchester and the Midlands suffered sporadic raids in June. But by way of set-off the improvement made in radio detection (see RADIOLOCATION) soon made itself felt in an increasing number of enemy raiders being brought down by the Brit. night-fighters especially on moonlight nights, and on May 10 the Gers. lost 33 machines; while for the whole of May no fewer than 143 night bombers were shot down, a substantial advance on any previous figures for night time.

The extent and fierceness of this raid on London, following on the prolonged attack on Liverpool, and the increasing activity over the rest of the country, seemed to presage a full-scale Ger. air offensive by way of preliminary to an invasion, and the widespread attacks on Brit. air bases on May 11 seemed to confirm this impression; but in fact these raids were quickly followed by a lull—the lull before the Ger. invasion of Russia—though occasional savage raids were still made, and the 'hit-and-run' raids were continued. But generally speaking the practical cessation of Ger. A. R. over Britain was the corollary to the concentration of Ger. air-power on the Russian front, and the battered industrial cities and ports of Britain now enjoyed a valuable respite, in which to remove the debris and return to an approximation to normal activity. Moreover it was now the turn of the Ger. cities to experience the nature of an all-out air attack, for more bombs were dropped by the R.A.F. on Germany in June 1941 than had been dropped on Britain in Apr., the peak month of the Luftwaffe's effort, and the ensuing months showed that the Brit. attacks were on an ever mounting scale. Britain, in fact, had now secured relative immunity from large-scale A. R. There was a recrudescence on a minor scale in Apr. 1942, the so-called 'Baedeker' raids on Brit. cathedral cities, such as York, Bath, Canterbury, and Exeter, alleged to be retaliatory raids for the bombing of Cologne, Moscow, and Lubek. These 'Baedeker' raids involved over 800 civilian deaths against only 20 in the

previous month, but comparison with the figure of 6000 fatalities in Apr. 1941 shows how steeply the scale of Ger. A. R. had declined, and mostly less than 30 machines took part in these attacks. Enemy A. R. against Britain in 1943, described not inaptly as 'scalded cat' raids, were mostly carried out against fringe targets and on no occasion were they on a heavy scale. On a number of occasions fast fighter-bombers were used, doubtless to keep down losses. There was little activity by day and most of the night-raids were scattered.

A few days after the allied invasion of Normandy began (June 1944) the Gers. opened an attack against London and S.E. England with jet-propelled flying bombs (V1). The attack was not on the scale the enemy had hoped because the launching-ramps in the Pas-de-Calais and elsewhere and storage depots in France were subjected to persistent pounding from the air. When it was no longer possible to launch them from the ground the Gers. used obsolescent bombers to release them while flying low over the North Sea. Later the V1 attacks, as they were called (see *FLYING BOMB*), were reinforced by rocket attacks (V2), mainly from Dutch bases. As these missiles (see under *ROCKET*) are invulnerable during flight, the allied air forces, whenever possible, attacked them while they were in transit from the underground factories within the Reich to their launching sites. A great deal of damage was done by the flying bombs during an intensive period of some 80 days in June-Aug. 1944. Croydon was very severely damaged, 3 out of every 4 houses being more or less damaged, and some 211 persons were killed—a low death roll owing to evacuation and good shelter accommodation. The 13 worst-hit (in order of severity) bors. were in the S.E.: Croydon, Wandsworth, Lewisham, Camberwell, Woolwich, Greenwich, Beckenham, Lambeth, Orpington, Coulsdon and Purley, West Ham, Chislehurst, and Mitcham. Wandsworth was only a degree less badly damaged than was Croydon. The old parish church of St. Leonard's, Hastings, was completely demolished. The V1 rocket attacks began in the early autumn of 1944, and continued intermittently until the later part of Mar. 1945, when they were stopped by the Canadian liberation of Holland. S. dists., especially, suffered from this long-distance bombardment, by both V1 and V2 attacks, which ceased on Mar. 27, 1945, when the 1050th and last rocket landed in Orpington. Throughout this period flying bombs, but in no great numbers, continued to come over. One of the worst incidents of the war was caused by a rocket which fell on Smithfield mkt. buildings in Mar., killing 115 persons, and seriously injuring 122, while another rocket at Stepney in the last few days of the attacks killed 131 and injured 40. It is conceivable that the Gers., who were experimenting in Norway with 'heavy water,' might have developed attacks on

Britain with atomic bombs, but they were utterly defeated before they could conclude their experiments. The total number of civilian casualties in the United Kingdom through enemy A. R. from the outbreak of war was 146,760. Of these 60,685 were killed and 86,175 injured and detained in hospital. The detailed figures were as follows: Killed (or missing, believed killed), men, 26,920; woman, 25,392; children under 16, 7736; unclassified, 537. Injured and detained in hospital: men, 40,736; women, 37,816; children under 16, 7623. See also under the names of individual cities.

*Chief Allied Raids on Germany, 1943-1944* (the 1940-42 bombing of Ger. tns. is dealt with under *AERIAL WARFARE*, when policy was in the making and allied A. R. were not on a very large scale). Berlin was bombed 4 times by the R.A.F. in Jan. 1943—twice in daylight by Mosquito bombers. Heavy bombers of the R.A.F.—Lancasters, Halifaxes, and Stirlings—dropped 4000- and 8000-lb. bombs or 'block-busters' (q.v.) on Berlin on Mar. 3. Munich was hit with 500 tons from R.A.F. bombers, Mar. 11. On May 17 daring low-level attacks were made by Lancasters on the Eder and Möhne dams in the Ruhr: the walls of the dams were blasted with 1500-lb. mines and great damage was done by flood waters down the Ruhr valley. A heavy blow to Ger. war industry was dealt by the R.A.F. raid, June 11, on Düsseldorf, the administrative cap. of the Ruhr and notable for its iron and steel, heavy engineering, and armaments plants. Münster was bombed again almost simultaneously. Transcending all these raids was the raiding of Hamburg, which might well be named the battle of Hamburg. Probably the dominant motive for the tremendous destruction wrought there was to paralyse the submarine-building industry—a paramount consideration for the W. Allies. In the great raids between July 24 and Aug. 3, 9 sq. m. of Hamburg were utterly devastated, and more than 77 per cent. of the city's 15 sq. m. of fully built-up areas wiped out. Eight shipbuilding yards were either destroyed or severely damaged; oil, non-ferrous metal, and chemical works were destroyed; most of the city's centre was destroyed; and vast damage done in the dock area. The total Brit. losses were 87 bombers, averaging no more than 14 a raid. On Nov. 4, by daylight, Amer. Flying Fortresses bombed Wilhelmshaven—also a submarine centre; while the R.A.F. made a night raid on Düsseldorf. The Flying Fortresses did not always escape punishment: while on Nov. 7, in their attack on the non-ferrous metal centre, Düren, 25 m. S.E. of Cologne, accompanied by a Thunderbolt fighter escort, they lost no machines; in an earlier raid, on the ball-bearing plant of Schweinfurt, they lost no fewer than 60 aircraft, but they were then without long-distance fighter escort. Berlin was again bombed by the R.A.F. on the night of Nov. 26, while, in the day, a great force of Amer. heavy bombers

attacked Bremen. The range of the heavy bombers was now being extended—thus on Dec. 3 the R.A.F. dropped 1500 tons on Leipzig. The year closed with more attacks on Berlin by the R.A.F., and these were continued in the early months of 1944.

*Raids on Berlin.*—It may be said that the real air battle of Berlin began on Nov. 18, 1943, and there were 6 major attacks between that date and the end of 1943. The chief destruction was in the W. and central parts, including the Tiergarten and Charlottenburg dists. A number of factories in the Reinickendorf dist. and the Siemensstadt, together with administrative buildings in the Wilhelmstrasse, were either destroyed or greatly damaged. There were 9 more major raids in the air battle of Berlin up to Feb. 15 (1944), the culminating raid of Feb. 15 being carried out by 1000 bombers, chiefly Halifaxes and Lancasters, 2500 tons being dropped in half an hr., for the loss of 43 machines. The damage by this date was officially estimated at 326 major war plants, 775 out of 1500 smaller plants, 7 gas works, 3 power stations, and the main offices of 21 gov. depts. Organised industrial activity virtually ceased in Berlin at the end of Nov. (1943), and had not been resumed late in Jan. 1944. But the 15 raids cost the R.A.F. 465 bombers and 3000 men. On Mar. 6 strong Amer. forces, escorted by long-distance fighters, attacked Berlin by daylight, this being the first heavy attack by the U.S.A. Strategic Force on the Ger. cap. They lost 68 bombers and 11 fighters, but themselves destroyed 120 Ger. aircraft. The U.S.A. Strategic Force made another attack on Mar. 8, losing 38 bombers and 16 fighters. Yet despite its continuous battering, the Allies considered that Berlin still contained much of military and industrial importance, and on Mar. 24 one of the heaviest attacks theretofore was made by the R.A.F., when 2500 tons were dropped. The Luftwaffe offered a spirited defence and the R.A.F. lost 73 aircraft. The effectiveness of allied bombing was much increased by its continuity—Amer. day raids followed or preceded by Brit. night raids either on the same target or on others in the Reich.

*Wilhelmshaven, Leipzig, Brunswick, Stuttgart, Gotha, Frankfurt, and Oschersleben attacked.*—Some 1100 Amer. bombers made a great attack on Feb. 3 on the port and naval base of Wilhelmshaven—the Flying Fortresses being escorted by fighters—Thunderbolts, Lightnings, and Mustangs. The greatest daylight assault of the war up to that date took place on Feb. 20 when 2000 allied aircraft, including a large force of Amer. heavy bombers, following a night attack on Leipzig by 1000 Brit. bombers, also bombed Leipzig, together with many other targets, including Gotha, Bernberg, Brunswick, and Oschersleben. Stuttgart was also a much-sought target, on account of its aircraft factories and repair depots. There was a double attack on Feb. 22 by the R.A.F., who dropped 2000 tons at

night, and a day attack by the Amers. with nearly 2000 aircraft, and another attack on Mar. 15, when the R.A.F. dropped 3000 tons, this being the city's sixth battering by the R.A.F. The mounting scale of Amer. attack is shown by the fact that between Feb. 20 and Mar. 9 (1944) the Amer. heavy bombers dropped 17,000 tons of bombs on Ger. plants and, together with Amer. fighters, destroyed 1023 Ger. planes in combat. Frankfurt was assaulted by over 2500 R.A.F. bombers on the night of Mar. 18, only a few hours after 1500 Amer. fighters and heavy bombers had returned from day attacks on industrial and other targets in S. Germany—aircraft factories and other war plants in Augsburg, Landsberg, and elsewhere. Frankfurt was an important war-production city and rail centre, and Amer. heavy bombers and the R.A.F. attacked it twice again in the same month. Brunswick, too, was subjected to many and severe attacks in the early months of 1944. Essen, which had been so severely hit in the battle of the Ruhr in 1943 and had not been raided for a year, was dealt its heaviest blow of the war, by the R.A.F., on Mar. 26, the assumption being that much of the war plant had been since restored.

On Mar. 30 the R.A.F. suffered their heaviest loss—94 aircraft—of a total force of nearly 1000 which attacked Germany, with Nuremberg as the main target—not a small price to pay even for a successful attack on an important war-production centre. The Luftwaffe, however, sent up the greater part of their entire night-fighter force to defend Nuremberg, and probably day-fighters as well, and the attackers were opposed by hundreds of twin-engined and single-engined fighters, or as many as those encountered by the U.S. Air Force in their great daylight raids.

The first time that more than 1000 heavy bombers attacked Berlin was during the night of Mar. 24, 1944, when Lancasters and Halifaxes dropped more than 2500 tons of bombs; but on June 21 more than 1000 Flying Fortresses and Liberators, accompanied by 1200 Lightnings, Thunderbolts, and Mustangs, attacked targets in Berlin and at Basdorf on the outskirts of the cap.—the targets being FW-190 engine factories at Basdorf, and railway yards and factories in Berlin. This was the largest force of aircraft ever sent against Berlin targets; 43 bombers and 7 fighters were lost, but the enemy lost at least 50 planes. The appearance of Thunderbolt fighters over Berlin for the first time showed that heavy Amer. fighters then had a sufficient range to enable them to do a 1200-m. round journey. On May 12 (1944) over 750 Amer. heavy bombers hit 4 synthetic oil plants near Leipzig and one in Czechoslovakia, this being the deepest penetration by U.S. bombers from Brit. bases. Heroic resistance was met, 150 Ger. aircraft being shot down for the loss of 42 Amer. bombers and 10 fighters.

But in the tremendous pounding of Germany's industrial areas by Anglo-Amer.



heavy bombers, records were often established only to be broken again soon after, and in daylight on Nov. 16, 1944, R.A.F. bombers, operating in support of the Amer. armies, dropped the greatest load of bombs of all time—more than 5600 tons—to obliterate the Ger. centres of Duren, Julich, and Heinsberg. The heavy bombers' main targets towards the end of the year (1944) were railway marshalling yards and oil plants, particularly the great synthetic plant at Leuna. Early in 1945 the allied strategic bombers had matters all their own way over Germany. Their numbers were enormous, whether by day or night; thanks to radar (q.v.) they could hit targets which they could not see, and by means of a Brit. invention for dispersing fog they could go up and come down in almost any weather. By Mar. the R.A.F. were using bombs up to 10 tons in weight, the first of these being dropped in N.W. Germany on Mar. 14 on a viaduct. Mar. 18 saw the biggest daylight air attack on Berlin when 1300 Liberators and Flying Fortresses sent down 30-ton salvos of bombs every 30 seconds on railway yards near the centre of the city, and vast armament plants in the industrial suburbs. The greatest previous raid on Berlin by daylight was that on Feb. 26 (1915) when 1200 aircraft took part. But by this time the allied bombers had more or less razed most of the larger Ger. cities, and although the Gers. had planned a great fleet of fighter planes for defence, including very fast types using jet propulsion, the bombing nipped most of it in the bud, and left few defences against A. R. save *flak*. It may be noted here that in Feb. 1945 a tremendous air assault was opened against Ger. communications with Italy in preparation for the final land offensive which the Allies launched on Apr. 8. For air raids against Japan see under PACIFIC CAMPAIGNS or FAR EASTERN FRONT IN SECOND WORLD WAR. See also AERIAL WARFARE.

Air Records, see under AERONAUTICS; ATLANTIC FLIGHTS.

Air-sacs, bladder-like chambers communicating with the lungs in birds. They are situated all over the body and make the aeration of the blood much more complete than in other vertebrates. In most cases they communicate with spaces in the bones, rendering them pneumatic, thus serving to lower the sp. gr. of the bird. A. are also found in the chameleon. These also are a complication of the lungs, and can be inflated, increasing the bulk of the animal.

Airship, a form of aircraft consisting of a torpedo-shaped envelope sustained in the air by being filled with gas, either hydrogen or helium. Although the idea of As. is old, it was not until the eighteenth century that serious consideration was given to them, when experiments were made in France, and continued there solely until Count von Zepplin conducted them in Germany from 1893. The main difficulty of the pioneer work was expense, chiefly due to the size of

the vessel, whence the slow development of As. compared with aeroplanes. Further, this difficulty limited, and still limits, practical interest in the subject to govs. with large funds at their disposal. Before the First World War Great Britain had done little compared with Germany. A few non-rigid As. had been constructed, such as *Nulli Secundus*, *Beta*, *Gamma*, until Ger. progress alarmed the authorities, and the ill-fated *Maffly* was built. This was Britain's first rigid A., but it met with disaster on its trial flight. When the First World War broke out, Germany was well in advance of any other country, a fact which was demonstrated very clearly in their early air raids over England, and which made the Brit. Gov. again turn its attention seriously to them. In 1915 a number of non-rigid As. had been built for anti-submarine work. By a stroke of fortune the Ger. *L. 33* was brought down in England in Sept. 1916, in such a condition that it was possible to copy her design successfully in the Brit. *R. 33* and *R. 34*, completed in 1919. Under the Treaty of Versailles Germany was forbidden to maintain As. of over 1,000,000 cu. ft. capacity. Consequently she disposed of these As. in part payment of reparations to the Allies. In May 1926, however, this limitation was removed. Great Britain after the First World War, constructed a few As., notably the *R. 100* and *R. 101*. The *R. 34* successfully crossed the Atlantic both ways (see ATLANTIC FLIGHTS). The Imperial Conference decided that A. routes were to be prescribed between the various parts of the Brit. Empire.

*Design and Construction.*—There are great differences in design between non-rigid, semi-rigid, and rigid types of A. A non-rigid A. is one in which the internal pressure maintains the designed shape of the envelope without the assistance of a rigid keel. A semi-rigid A. has a rigid keel to distribute the load and assist in keeping the designed shape of a non-rigid envelope. A rigid A. has a rigid framework to maintain the designed shape of the hull. *Non-rigid A.*: As in the case of a kite balloon, the shape is maintained solely by the internal gas pressure. The type which survived others of simpler frame was designed by Torres in Spain and was manufactured in France. Although in outline the shape is only a streamlined balloon, the circular shape is distorted to form a trefoil section, having 3 equal lobes. In this way an internal system of triangular bracing is possible, and to this the dead weight of the car and engine are carried by ropes. The car is slung immediately underneath the envelope, rather to the front of the ship, provision being made for the engine at the rear of the car. A pressure airscrew is employed, or separate engine units may be installed. The ballonets in the lobes maintain the shape of the envelope when the internal pressure is varied. To assist the retention of the A.'s shape, ribs are generally fitted at the nose in radial directions and

taken back behind the plane of the nose. The ship is equipped with relatively large rudder and elevator planes, to the rear of which the rudder and elevator are respectively attached. The basket is fitted with a power plant and a propeller. The non-rigid A. or 'dirigible' balloon is the smallest of the types of A., and with increase of size the balloon becomes unwieldy and loses its shape. *Semi-rigid A.*: This type was introduced in order to relieve the envelope of a non-rigid ship from some of the strain arising from the connection of cabins, power cars, etc., thereby permitting an envelope of circular cross-section to be employed. For this purpose a keel consisting of a braced structure, generally triangular or rectangular in section, is suspended, immediately below the envelope, and to this the dead weights of the car and engine are transmitted. In modern designs—e.g., in the case of the *Norge*—the keel is practically enclosed in the envelope, so as to produce a good streamlined shape of low head resistance. *Rigid A.*: The much larger ships are all of this type, and it is the only type which is likely to have any practical use in the future. The rigid type was developed in Germany by Count Zeppelin, and consists of a framework of girders whose external form corresponds with the shape of the A., the covering being directly attached to the girders. The earlier rigidships were made with a relatively long central parallel portion and with a short head and tail; the parallel part underwent successive shortening until the modern perfect streamline shape was evolved. In order to obtain minimum resistance, the actual lines of the hull were determined from a consideration of the rates of change of curvature. Structurally the framework consists of a series of transverse hoops or rings connected to a series of longitudinal; both the rings and longitudinal are similarly constructed, frequently being triangular in section. The rings are polygonal, having approximately 25 sides. Provision is made for efficient connection between rings and longitudinal, while the whole structure is made rigid by a system of wire bracing. The space between 2 rings is occupied by a ballonnet, and there may be as many as 20 ballonnets in all. About half the bags are fitted with a manoeuvring valve on top, but each is supplied with an automatic valve which maintains the pressure at some predetermined amount, usually opening when the A. has reached an altitude of 20,000 ft. The navigating car is suspended near the nose of the ship and is fitted with the usual controls and instruments. There is also an aft car fitted out as an auxiliary control car in case of emergency. The engines are installed in the rear of these cars. The *Hindenburg* was the most modern rigid type of A., and made its first flight in 1926. Its length was 800 ft., maximum diameter 135 ft., gas capacity 6,700,000 cu. ft. The structure in its main conception was the same as has been successfully developed during the past 35 years. It

had 15 main transverse frames, each of which was a 36-sided regular polygon. Its passenger accommodation was arranged on 2 decks inside the exterior envelope. A control car and 4 engine gondolas were mounted externally. The outer fabric was doped with celloidin, mixed with aluminium powder on the outside to increase the heat reflection; on the underside the fabric was porous to assist ventilation. On its preliminary trial the ship attained 178 m.p.h. The *Hindenburg* was destroyed by fire in May 1937, when about to land at Lakehurst, New York, at the end of her first voyage of the year, 33 persons being killed out of a total of 97 on board. After the First World War the U.S.A. suffered serious A. losses in those of the *Shenandoah* and the *Akron*. The first of these losses did not retard development, and the authorities, profiting by experience, built mooring-masts across America, it having been found that operating A. from their sheds limited their use. But further loss came when the *Akron* (U.S. Navy A.) crashed off New Jersey on Apr. 4, 1933, in an electrical storm, with the loss of 71 of her 77 officers and guests aboard, including Adm. William Moffett, chief of the Bureau of Aeronautics. Her loss was in fact due to the same cause as that which destroyed the *Shenandoah*. The *Akron* was not so large as the *Hindenburg*—being 785 ft. long, with a gas capacity of 6½ million cu. ft. and diameter 132 ft. A sister ship, the *Macon*, was launched in 1933. Great Britain, France, Italy, and Japan, however, all decided to abandon A. construction; but Germany, in no way dismayed, kept the *Graf Zeppelin* on passenger transport service as late as 1938. Great Britain's worst disaster was the loss of the *R. 101* on Oct. 5, 1930. The A. had started on an official flight to India, but came down at Beauvais in France, being totally destroyed by fire; 48 of the company of 54 being burned to death, including Lord Thomson, secretary of state for air, A. M. Sir Sefton Brancker, and Maj. Richmond, the designer. The court of inquiry found that the accident was caused by a substantial loss of gas in bumpy weather. Had helium been used instead of hydrogen, the loss of life would not have occurred, but hydrogen was used because of its greater lifting power.

Consult V. C. Richmond, *Some Modern Developments in Rigid Airship Construction*, 1928; E. F. Spinner, *About Airships*, 1929.

**Air Survey**, see under SURVEYING AND LEVELLING.

**Air Transport**, see AIR MAIL; AIRWAYS, BRITISH; AIRWAYS, IMPERIAL; AVIATION, CIVIL.

**Air-valve**, an arrangement to prevent the compression of air where there is a bend in line of water-pipes. When the pipes are filling with water the driving of the air to the upper part of the bend might cause sufficient compression to stop the flow, if it were not allowed to escape. The valve is closed by a guided

float if the water itself reaches to the top of the bend.

**Air-vessel**, a chamber interposed between the pump and delivery pipes in single-acting pumps. The air in the chamber is compressed at each forward stroke of the pump, thus providing a pressure which serves to drive the water on during the backward stroke. As the water tends to absorb the air, the latter must be replenished from time to time.

**Aird, Thomas** (1802-76), b. at Bowden, Roxburghshire, and educated at Edinburgh Univ., was the friend of Carlyle and Hogg. His literary work, though praised by Carlyle, has never become popular. The best known is his poem *The Devil's Dream*.

**Airdrie**, tn. of Lanarkshire, Scotland, on the high road between Edinburgh and Glasgow. The development of coal and iron mines in the vicinity has caused great increase in its prosperity during the last century. Cotton-weaving and paper-making are also carried on. Pop. 26,000.

**Aire**, a riv. of Yorkshire; it has its source in the Pennine Hills, Lancs, but early in its course passes through the A. Gap into Yorks, runs through the S. part of the co. to join the Ouse near Goole, its length being 70 m. Airedale, through which it flows, is a picturesque valley lying between Malham Cove and Leeds.

The A. and Calder Navigation is a system of rivs. and canals serving the larger Yorkshire towns. Its chief branches are from Goole to Leeds and from Castleford to Wakefield.



AIREDALE

T. Fall

**Airedale**, a breed of large, rough-haired terriers forming the link with the hound group, and said to be a hybrid between the otter-hound and the Welsh terrier or a local terrier of the Aire Valley. It is the largest of the terriers and was first bred in 1853. It has a close, wiry coat of black and tan, short straight back and sloping shoulders, flat skull, forelegs perfectly straight, and

powerful jaws. A full-grown dog should weigh about 45 lb. It needs much open-air exercise on account of its strength and size, and is not suited for life in small houses in towns.

**Aire-sur-Lys**, tn. in the dept. of Pas-de-Calais, France, at the junction of 3 canals with the R. Lys, has a large trade in agric. produce.

**Airolo**, a vil. of Switzerland, canton of Ticino, at the S. end of the St. Gothard railway tunnel. Elevation 3800 ft. A bloody battle was fought here between the Fr. and the Russians in 1799. The tn. was almost destroyed by an avalanche in Dec. 1898. Pop. 1600.

**Airways, British**. An air transport company, with offices at Terminal House, Grosvenor Gardens, S.W.1., which before the Second World War operated services from Heston to Hamburg, Copenhagen, and Stockholm; Heston to Paris; Croydon to Berlin; Croydon to Hanover. Like Imperial Airways (q.v.), the company was given financial assistance by the Gov. for developing Brit. air routes overseas. It was the first Brit. air line company to operate regular night services. The Cadman Committee, in 1933 (see under AIRWAYS, IMPERIAL) recommended that B. A. should be entrusted with the development of European services other than those on the London-Paris route, which were to be operated by a new company combining the interests of B. A. and Imperial Airways. The Gov. also chose this company to operate the England-S. America air route via the W. coast of Africa. A number of 250-m.p.h. Lockheed 14 air liners were ordered for the inauguration of a regular passenger and mail service to Lisbon along this section. The night mail services of B. A. were operated from Croydon, all other services of the company were operated from their terminal airport at Heston, to which the company's fleet and maintenance organisation were transferred from Croydon and Gatwick in 1938. Under a Bill introduced in 1939 the undertakings of Imperial Airways and B. A. were transferred to a new State-guaranteed corporation, the Brit. Overseas Airways Corporation (B.O.A.C., q.v.).

**Airways, Imperial**. The first Brit. national air transport company, incorporated in 1924. It operated regular daily services in Europe from London to Paris, Brussels, and Cologne and, at certain seasons, Basel, Le Touquet, and Zürich. It had (1939) 8 weekly services to Egypt and back, 5 to India, 3 to Singapore and Central Africa, and 3 to Sydney via Egypt, Palestine, India, Burma, and Malaya. There was a weekly service between Khartoum and Lagos and a weekly service between New York and Bermuda; besides numerous other services and connections. In 1924-25 the company flew 11,395 passengers, 212,380 letters, and the aggregate m. flown were 853,042; by 1932-33 the totals were 53,080 passengers, 11,400,000 letters, 2,354,176 m.; by 1936-37, 64,771 passengers, 35,668,430 letters, 5,231,653

m. The Atlantic air route was subsequently under investigation by I. A. in collaboration with Pan-Amern. Airways. Flying boats were used on Empire air routes, but it was proposed to use land planes to supplement these services and also on the N. Atlantic route. It was granted a subsidy by the Gov. for the development of Brit. air routes overseas. In 1937 I. A. and associated companies had a fleet of 78 aircraft—31 flying-boats and 47 land planes—in operation and under construction. Some 8 improved flying-boats were being constructed (1938–1939), including 22-ton Ensign liners and the *Frobisher*, which was among the fastest passenger aircraft in the world. The flying-boat fleet of I. A. was the largest of any company in the world. They included *Heracles*, *Scylla*, and *Diana*, classes, used on the European routes, Imperial, on the services to Africa, India, and Australia; *Cavalier*, between Bermuda and New York. Serious accidents were few: in 1933 the *City of Liverpool* machine caught fire over Dixmude on the way from Brussels to London, all 15 persons on board being killed. Following some staff troubles, the Gov. appointed a parl. committee of inquiry under Sir John Cadman, as a result of whose report a whole-time chairman (Sir John Reith) was appointed. The air transport undertakings of I. A. were acquired on April 1, 1940, by Brit. Overseas Airways Corporation (q.v.).

**Airy, Sir George Biddell** (1801–92), an Eng. astronomer, b. at Alnwick, and entered Trinity College, Cambridge, in 1819. After a brilliant college career, he was elected Plumian prof. of astronomy in 1828. In 1836 he was appointed Astronomer Royal at Greenwich Observatory, where he made important researches in magnetism, meteorology, etc. Among his works are *Astronomical Observations, Tides and Waves*, 1842; *Ipswich Lectures on Astronomy*, 1851; *Treatise on the Errors of Observation*, 1861. Fuller information may be found in his *Autobiography*, 1896.

**Aisle** (Fr. *aile*, Lat. *ala*, a wing), any lateral div. of a church or other edifice. Generally in England there is only 1 aisle on each side of the nave, but on the Continent there are sometimes as many as 3.

**Aisne** (Lat. *Axona*): 1. A Fr. riv. rising in the Mouse dept. and flowing into the Oise near Compiègne. Length, 170 m. 2. A dept. in the N. of France. Surface, flat and undulating; soil, good; climate, damp and cold; cereals are generally cultivated. There are important woollen manufs. The dept. is watered by the Marne, Oise, and Aisne. Cap., Laon. Pop. 453,400.

**Aisne, Battles of the.** The valley of this riv., extending as it does from Compiègne and the vicinity of Noyon, through Soissons and the dept. of the Meuse to the Argonne forest and to within 25 m. of Verdun, was fated to be the scene of bitter fighting in any war in which the Ger. armies should invade France from the N.E. This proved to

be the case, though the character of the fighting was, no doubt, very different from what was contemplated by the General Staff of either side. There were 3 B. of the A., fought respectively in 1914, 1917, and 1918, but the Brit. armies were not especially involved in the second battle, which began a few days after the Brit. attack at Arras had closed.

**First Battle of the Aisne.**—The advance to the Aisne began with the allied victory of the Marne on Sept. 6, 1914, and continued until Oct. 1. When conditions stabilised, the trench warfare, which was to endure for 4 years, began. So far as the Brit. Army was concerned, this warfare was improvised, for the only heavy guns it had were a few batteries of old 6-in. howitzers and but meagre engineering stores. The compilers of the Brit. official *History of the Great War* conclusively refute the assumption that entrenchments had already been prepared on the Aisne heights in anticipation of retreat. On the contrary, when this, the so-called race to the sea, began, there was a moment when a real gap yawned between the Ger. First and Second Armies covered only by Ger. cavalry; and the Brit. First Corps, under Haig, was thrown into the attack with every prospect of success, but vainly as it turned out, because before the attack could be fully launched, the Ger. reserves, which were too late for the Marne battle, reached the gap and closed it. Indeed, no one had foreseen the deadlock which now ensued, nor envisaged the implications of scientific progress in the art of modern warfare whereby the hope of outflanking a line which could seemingly be endlessly extended was finally dispelled and the long routine of dreary trench fighting without tangible results set in. Such deadlock was certainly no part of the original Ger. plan, though the natural advantages of the regions of the *Chemin des Dames* and the forests of St. Gobain and the Argonne had suggested the provision of entrenchments in the rear in case of retreat. The allied forces continued their frontal attack in the vain expectation of outflanking the Ger. line, but as the battle proceeded, found that the Gers. were but fighting rearguard actions to cover their further and leisureed retirement.

The actual battle began on Sept. 13, the Gers. being then N. of the riv. with their guns concealed on the N. slopes. Despite the depth of the riv., Maunoury with the Sixth Army, attacking on the left from Compiègne, succeeded in getting sev. divs. across; the Brit. Army sustained the general attack from the point of junction with the Fr. at Soissons for a distance of 15 m. On the 14th, Maunoury captured Noviron and attacked the heights only to find, as did the Brit. after capturing Troyon, that the enemy positions on the high ground were invulnerable. On the 15th the Gers., counter-attacking, drove the Fr. from Noviron and the Brit. back to the riv. Marshal Joffre, who was then in supreme command, then began a

change of strategy, lengthening his left by forming 2 new armies, but the only result of this collision of equally balanced forces was to force them out westward, and the same result ensued in the opposite direction when the Gers. sought to outflank Gen. Sarrail on the Meuse.

**Second Battle of the Aisne.**—This battle was begun on Apr. 16, 1917, by Gen. Nivelle attacking the 'Hindenburg line' near Laon. His strategy was the antithesis of that of Joffre, whom he had succeeded, namely to deal a decisive blow rather than to wear down the enemy by attrition. He actually endeavoured to storm the Aisne heights in one supreme attack launched from 3 quarters simultaneously with the whole of his forces, the main offensive being in the vicinity of the lower ground before Laon. He captured the riv. banks from Soissons to Berry-au-Bac, together with 20,000 prisoners and nearly 200 guns, but he found the road to Laon impregnable. His disastrous strategy caused a reaction to the Fabian tactics of Foch and Pétain, the latter being appointed generalissimo in his stead, and once more the allied armies settled down to the more effective if protracted method of a war of attrition, in which the side which should eventually receive heavy reserves at the decisive moment would of necessity win the day.

**Third Battle of the Aisne.**—This battle was part of the Ger. offensive in Champagne, which extended between May 27 and June 6, 1918, the geographical limits, so far as the Brit. forces were concerned, being between the Chemin des Dames and the Montagne de Reims, E. of Verneuil. Ludendorff had recently held out hopes to Germany of a supreme and decisive effort before the Amer. armies could be thrown into the fray, inasmuch as he had driven a deep salient into the Brit. lines near Arras and the Ger. effectives still outnumbered those of the Allies. There was some justification for the high hopes entertained in Germany as to the outcome. The offensive against the Fr. was begun on the Aisne heights, this being the zone nearest to Paris and the Marne and the Paris-Châlons railroad. The Ger. preparations were made with dispatch and secrecy, and on May 27 the preliminary artillery bombardment began all along the line from the Ailette to the environs of Reims. Before the day was over, the Fr. had retreated from the heights N. of the riv. and the Ger. troops under Gen. von Boehn had crossed the riv. at Fismes, capturing numerous prisoners, guns, and other booty. Flushed with success, the Ger. command deepened its thrust from Fismes right to Château-Thierry on the Marne; but never for an instant did Marshal Foch allow his major strategy—the strengthening of his flank positions at Reims and Soissons—to be distracted, and before long the tide was destined to turn. (See also MARNE, BATTLES OF THE.)

**Aissé, Mademoiselle** (c. 1694–1733), Fr. letter-writer, b. in Circassia, captured by Turks, and sold in 1698 as a slave to

the comte de Ferriol, Fr. ambas. at Constantinople, who had her educated in Paris. She attracted much attention by her beauty and romantic story. *J.* in Paris. Her letters to Madame Calandrini, first pub. 1787, with notes by Voltaire, reveal her tenderness and fidelity. Other eds. appeared in 1846, by S. Ravenel, with an introduction by Sainte-Beuve, and in 1873, by E. Assé. See also her *Life* by Courteault (1900).

**Aistulf, or Astolf, king of the Lombards** 749–56, succeeding his brother Rachi. Captured Ravenna and the Pentapolis 751–2, and marched against Rome. The pope called to his aid Pepin, king of the Franks, who defeated A. in 754. A. again besieged Rome in 756, and was forced by Pepin to give up the exarchate of Ravenna and the Pentapolis to the pope. See Gregorovius, *City of Rome in the Middle Ages*, vol. ii., 1896.

**Aitken, James** (1752–77), known as 'John the Painter,' was apprenticed as house-painter in Edinburgh, but came to London and turned highway robber. He was concerned in the tea-duty riots at Boston, U.S.A., set fire to some storehouses at Portsmouth and Bristol when the fleet was about to sail for America, and was executed 1777.

**Aivalik, or Alvalik**, is a seaport on the gulf of Edremit, Turkey, N. of Smyrna. It was burnt by the Turks in 1821, but was soon rebuilt, and exports oil, olives, and corn. Pop. 38,300.

**Aix, a tn. in the dept. of the Bouches-du-Rhône, France**, the former cap. of Provence. Here C. Sextius Calvinus, the Rom. consul, founded a colony 120 B.C., giving it the name of Aquæ Sextiæ, on account of its mineral springs. It is a handsome tn. and contains the cathedral of St. Sauveur, the Palais, Museum, and Library, besides a univ. and school of art. It is the see of an archbishopric, does a considerable trade in olives, oil, and wine, and is engaged in cotton-spinning and tanning. Pop. 38,300.

**Aix, a fortified is. opposite the mouth of the Charente, France.** Here the Fr. were victorious over the Brit., 1806, and there was an indecisive naval battle in 1809. Napoleon on board the *Bellerophon* surrendered here to the Brit., 1815.

**Aix-la-Chapelle, see AACHEN.**

**Aix-les-Bains, a tn. in Savoie, France.** In the time of the Romans it was called Aquæ Allobrogum, and Aquæ Gratianæ or Domitiane. It is situated in a healthy valley, and its hot springs attract many visitors. Pop. 12,900.

**Ajaccio, cap. of the Fr. dept. of Corsica**, is situated on the W. coast of that is., on the N. of the gulf of Ajaccio. The house in which Napoleon I. was born (1769) is still preserved as national property. The chief employments are the anchovy and pearl fisheries, while much olive oil is exported. The city has a fine harbour and cathedral. Pop. 37,100.

**Ajaigarh, a hill fort of India**, giving its name to a state, in Bundelkhand. It was captured by the Brit. in 1809. It contains the ruins of sev. temples covered

with sculptures. The religion is Hindu. Area: 800 sq. m. Pop. 96,000.

**Ajalon**, the modern Yalo, is mentioned in biblical hist. as the scene of Joshua's defeat of the Canaanites, when he made the sun and moon stand still till the victory was complete. It was given to the tribe of Dan.

**Ajax**, son of Oileus, sometimes called the lesser A., sailed against Troy with 40 ships. On his homeward journey his vessel was wrecked; he escaped to a rock, but when he boasted that he would be saved in spite of the gods, Poseidon split the rock and A. perished (Homer, *Odyssey*, iv.). Virgil tells us that he excited the anger of Athena (*Æneid*, i.).

**Ajax**, son of Telamon, sometimes known as A. the Great, was one of the most renowned heroes of the Trojan war. He engaged in single combat with Hector (Homer's *Iliad*, book vii.), and defended the ships and killed many Trojans (*Iliad*, books xiii.-xvii.). He contested with Ulysses for the armour of Achilles, and when it was awarded to Ulysses, A. in madness killed himself (Sophocles, *Ajax*; Ovid, *Metamorphoses*).

**Ajlun**, a dist. or *liwa* of Transjordan. It is almost entirely occupied by a settled pop. rather than Beduin. In the mts. of A., in Biblical times, dwelt the tribe of Manasseh. On the foothills of these mts., 3 m. W. of Jerash, is a pleasant vil. Reimun, which has been identified with Ramoth-Gilead. Arx Ajlun was the crusaders' name for Qala'at al-Rabad—surmounting the vil. of A.—the most important of the Saracen fortresses in Transjordan. The headquarters of the *liwa* are at Irbid. There are local chambers of commerce at both Irbid and the vil. of A.

**Ajmer**, or **Ajmere**, an important city of India, in the native state of Rajputana, 220 m. S.W. of Delhi. It is situated at the foot of Mt. Taragarh in a picturesque valley; many of the streets are spacious, with fine temples. It contains the tomb of the Moslem saint Kwaja, much frequented by pilgrims, and is the cap. of the prov. of A.-Merwara. Pop. 120,000.

The prov. of A.-Merwara has an area of 2700 sq. m. and a pop. of 560,000, 80 per cent of whom are Hindus. The prov. was ceded in 1818.

**Ajodhya**, of which the glories are described in the *Rāmāyana*, was the anct. cap. of Oudh, and was situated on the r. b. of the Gogra near Fyzabad. Its ruins alone remain, overgrown with jungle. The modern tn. of the same name is chiefly notable for the annual fair of Itamarni, which attracts 500,000 pilgrims.

**Ajuntha**, or **Ajanta**, a vil. of Halderabad famous for its Buddhist cave hermitages excavated in the side of a rugged and densely wooded ravine some 4 m. from the vil. These caves, numbering about 30, comprise dwelling and meeting halls, have a cloistral appearance, and date back, in many cases, to 200 B.C.

**Ajuroca**, tn. of Minas Geraes, Brazil, on riv. of same name, 107 m. N.E. of Rio de Janeiro. The industries of the dist.

are stock-raising and the growing of tobacco, manioc, sugar, millet, and coffee. Pop. 6000.

**Akabah**: 1. An Arabian tn. on the E. side of the gulf of A., which has been identified with the biblical Elath. It is on the pilgrim route from Egypt to Mecca. 2. A gulf formed by a branch of the Red Sea between the peninsula of Sinai and the N.W. of Arabia. It is the anct. Sinus Atlanticus.

**Akbar** (the 'great,' his proper name being Jelal-ed-din Mohammed) was b. at Umarkot in 1542, when his father was fleeing to Persia from Delhi. He was the wisest and greatest of the Mogul emperors. In 1555 his father regained the throne, but d. in the same year. A. committed the care of the kingdom to a regent, Bahram Khan. At that time few of the provs. originally subject to the Mogul emperors were in submission, and Bahram reduced many of them. However, he was despotic and cruel, and in 1560 A. took the rule into his own hands. In 10 or 12 years he had conquered all India N. of the Deccan, and was able to devote himself to administration. His name as a ruler is inseparable from that of his minister, Abul Fazl, who later left an enduring record of the emperor's name in the *Akbar Nameh*. The pair ruled with wisdom and vigour, repressing vice with a firm hand. Roads were made, and commerce was encouraged in every way.

A.'s reign marks the beginning of a new epoch, and is one of the most important periods in the religious and literary hist. of India. A. was not firmly attached to the Mohammedan faith, and called for Portuguese missionaries from Goa to explain Christianity to him. Ultimately he adopted an eclectic kind of Deism, while allowing religious liberty to his subjects. He encouraged literature and estab. schools throughout the country. See G. B. Malleson's *Akbar* ('Rulers of India' series), 1890.

**Akeldama**, see ACELDAMA.

**A' Kempis**, Thomas, see THOMAS A KEMPIS.

**Akenside**, Mark (1721-70), was b. at Newcastle, and in 1739 was sent to Edinburgh with the object of studying theology for the Presbyterian ministry. A year later he gave up this object for the study of medicine, and in 1744 took his degree of M.D. at Leyden. On his return he practised in Newcastle, Hampstead, and finally London. His haughty and pedantic manner (satirised by Smollett in *Peregrine Pickle*) prevented him from gaining a large practice. His profession, indeed, would hardly have supported him had not his friend Dyson made him an allowance of £300 a year. He had pub. verses in the *Gentleman's Magazine* as early as 1737, but his literary reputation rests on his *Pleasures of the Imagination*, commenced in 1738 and pub. in 1744. Its didactic nature made it popular at the time; it was approved by Pope and tolerated by Gray. A. also wrote various medical treatises on dysentery. See his *Life* by Bucke (London, 1832).

**Akhissar** ('white castle'), a tn. in Asiatic Turkey, 50 m. N.E. of Smyrna. It was the anct. Thyatira, one of the 7 churches spoken of in the Apocalypse. It exports cotton, wool, etc. Pop. 12,000.

**Akhlat**, a tn. of Asiatic Turkey, on N.W. shore of Lake Van, 203 m. S.E. of Trebizond. Formerly the seat of the Armenian kings. Pop. 4800.

**Akhmim**, tn. of Upper Egypt, on Nile, 85 m. S.E. of Assiut. A steamboat and mail station, and long famous for textile manufs. Pop. 30,300.

**Akhmaton**, **Akhenaton**, or **Ikhmaton**, Pharaoh of the eighteenth dynasty, succeeding his father, Amenophis (or Amenhotep) III., as Amenophis IV. His reign was marked by religious fanaticism, the worship of all other gods being abolished in favour of the sun-god. He was especially opposed to the god Ammon, erasing his name from all monuments and abandoning Thebes for a new cap. at El Amarna, dedicated to Aton, the sun-god. He neglected other affairs, and his reign marks the end of Egyptian rule in Syria. He d. c. 1350 B.C., after reigning about 17 years. See A. E. P. Weigal, *Life and Times of Akhnaton*, 1910. See also EGYPT; TELL EL-AMARNA.

**Akhtirka**, tn. of Kharkov, Ukraine, on a small trib. of the Dnieper and 58 m. N.W. of the tn. of Kharkov. Pop. 27,000.

**Akibah**, **Ben Joseph**, see **AQIBA**, **BEN JOSEPH**.

**Akka**: 1. A pygmy negroid race inhabiting the African equatorial belt. The A. (Arab, Tikki-Tikki) are found along the upper course of the Aruwimi and W. of Lake Albert, and were discovered by Schweinfurth about 1872. They are yellow-brown in colour, and about 4 ft. 6 in. high, and live nomadically, apart from, though usually under the protection of, the taller races. 2. A vil. of the Sahara on the Moroccan border; one of the stations on the Morocco to Timbuktu caravan route. 3. Anct. name of Acro (q.v.).

**Akka**, see **ACRE**, **ST. JEAN D'**.

**Akkad**, see **ACCAD**.

**Akkerman**, see **CETATEA ALBA**.

**Akmoilinsk**: 1. Region of Kazakh, S.S.R. It is in the Kirghiz Steppe region of W. Siberia and lies between the Rs. Uln-Tai and Ishim on the W. and Irtysh on the N.E., but has a pop. largely nomadic, of only about 800,000. It may be divided into 3 parts; the N., a low brackish plain; the central, occupied by the Tarbagatai Mts., containing gold, copper, and coal, and interspersed with fertile valleys; and the S. desert. The chief industries are agriculture, cattle-rearing, and transport. 2. Cap. tn. of prov., on R. Ishim, 300 m. S.W. of Omsk. Pop. 12,700.

**Akola**, tn. in dist. of same name, W. Berar, India, on R. Morna, 55 m. S.W. of Ellichpur. Pop. 47,000.

**Akot**, tn. in Akola dist., W. Berar, India, 35 m. S.W. of Ellichpur. It has a large trade in cotton. Pop. 18,000.

**Akron**: 1. Cap. city of Summit co.

Ohio, on Ohio Canal, 38 m. S. of Cleveland, containing numerous factories and mills. Pop. 244,000. 2. Tn. in Erie co., New York; manufs. cement; pop. 1960. 3. Tn. of Plymouth co., Iowa, containing large flour-mills. Pop. 1324.

**Aksakov**, **Konstantin** (1817-60). Russian Slavophil writer, son of Sergei A., b. in Moscow. His idealism is a mixture of hallucination and real knowledge, though his theories are imbued with life as in *The Prince Lupovitsky* and in *Moscow Delivered*—two dramas which contrast the naturalness of the people with the corrupt culture of the upper classes. His works, historical, poetical, and critical, were collected in 5 vols. D. at Zante, Greece.

**Aksakov**, **Ivan** (1823-86). Russian writer and leader of the Pan-slavist or Slavophil movement, son of Sergei A. (q.v.). He began his literary career as a poet, but it was as a political publicist that he became famous. Like his father, he spent sev. years in the Gov. service before taking up writing. He reached the height of his influence in 1876-78, when he was the mouthpiece of the general enthusiasm for the liberation of the Balkan States. Next to Herzen his is the greatest name in Tsarist Russian political journalism.

**Aksakov**, **Sergei Timofievich** (1791-1859), Russian writer, b. in Ufa, Orenburg. His grandfather was an energetic pioneering squire who planted a colony of serfs in the Bashkierian region. A. took a situation as gov. clerk after obtaining his degree at Kazan. He joined the circles of literary contemporaries and was patronised by Adm. Shishkov, of whom he left a delightful character sketch. In 1830 he left the civil service and lived the easy life of a gentleman of comfortable means. His *Notes on Angling* (sport in Orenburg), 1847, and *Notes on Shooting in the Orenburg Country*, 1852, are written in a simple yet vivid style and were enthusiastically reviewed by Turgenev and Gogol. Some of his work shows the influence of Gogol, but his *Years of Childhood* and *Bagov the Grandson*, 1858, have the characteristics of Proust. *Natasha*, 1859 (uncompleted), is a record of his younger sister. Other works: *A Russian Gentleman* (trans. 1917) and *Chronicles of a Russian Family* (trans. 1924).

**Akureyri**, tn. of Iceland, on Eyjafjörðr. It has a good harbour and is an important trading centre. Pop. 4500.

**Akyab**, a dist., area 5136 sq. m., and tn. in the Arakan div. of Burma. After the cession of Arakan in 1826 A. was made the seat of gov., and rapidly grew from a small fishing vil. into a leading port, chief export rice, several large rice mills. Pop., dist. 576,340; tn. 36,569.

**Alabama**, the 'Cotton State,' one of the gulf states of the U.S.A., bounded on the N. by Tennessee, on the E. by Georgia, on the S. by Florida and the gulf of Mexico, on the W. by Mississippi, and having a gross area of 51,609 sq. m. In the extreme N. of the state is part of the fertile valley of the Tennessee: to

the S. of this lies a hilly region containing parts of the Alleghany and Cumberland ranges, in which coal and iron are found. The centre of the state is occupied by the Cane-brake or Black Belt, one of the most fertile cotton countries in the world. To the extreme S. is a low-lying, sparsely populated dist., very heavily wooded. The country is well watered, and the A. and Tombigbee are navigable rivs. The leading industry of the state is still agriculture. A. ranks as one of the leading cotton-producing dists., and Indian corn, tobacco, rice, and wheat are largely grown. There are large coal, iron, and steel industries in the N., and cotton manuf. and the lumber trade are considerable. The climate is warm and equable and very healthy except in the low-lying land in riv. valleys.

A. takes its name from an Indian tribe, which formerly inhabited this region. The ter. now constituting A. was first explored in 1540 by the Spaniard, De Soto, who passed through it from Florida to the Mississippi. The first permanent settlement was made by the Fr. on Mobile Bay in 1702, and was removed to the present site of Mobile in 1711. Towards the close of the seventeenth century France asserted her title to this region, basing her claim on the discoveries of Marquette and Joliet, who descended the Mississippi to the Arkansas in 1673, and of La Salle, who sailed down the Mississippi to its mouth in 1682. England, too, claimed the region N. of the gulf of Mexico, and the ter. now forming A. was included wholly or in part by the Carolina Charters of 1663 and 1665, and by the Georgia Charter, 1732. In 1763 the Fr., by the peace of Paris, ceded A. to Great Britain; Florida, then a part of A., being also transferred to Great Britain by Spain. The treaties of Versailles and Paris led to complications over A., between the U.S.A., Spain, and England, but at the close of the eighteenth century all the present area of A., except that portion lying S. of the thirty-first parallel, was ceded by Great Britain to the U.S.A. The Floridas were transferred by Great Britain to Spain at the same time. In 1795 Spain relinquished her claims to the ter. N. of the thirty-first parallel. In 1819, after Spain had virtually given up all claims to any ter. in A., A. became a state with boundaries as at present, and was admitted to the Union.

Disaster befell A. in 1837 as a result of the corruption of the note-issuing state banks, and the state's public debt reached over 3½ million dols. Further trouble occurred over the slave-holding question, the 'Alabama Platform' definitely pronouncing against any infringement of slave-holding rights. A., in 1860, together with other cotton states, seceded from the Democratic National Convention, and as a Confederate state sent out the bulk of its male white pop. to fight against the N. After the war the negro pop. gained the ascendancy and disfranchised the white voters, but financial disaster quickly followed,

the state debt reaching 26 million dols. in 1874. In 1901 a new constitution greatly curtailing the negro voting power was adopted. A. has 37 railways, 8 of them trunk lines. More than a third of the landowners are coloured; there are strict laws against the marriage of whites and negroes. Pop. (1940) 2,832,961, of whom 65 per cent are white. The state cap. is Montgomery (pop. 78,000); the seaport is Mobile. Prin. tns., Birmingham, Anniston, Selma, Bessemer.

**Alabama, The**, a Confederate cruiser in the Amer. Civil War which, causing immense loss to the commerce of the Federal States, gave rise to the celebrated Alabama Question, and led to strained relationship between the govts. of the U.S.A. and Great Britain. England accorded to the Confederates the status of belligerents, and was lax in the enforcement of strict neutrality. This very nearly precipitated a war between the 2 countries, which was only averted by arbitration. The A. was built in the yard of Messrs. Laird & Sons, Birkenhead, and the vessel, before coming out in her true light by being named after one of the seceding states, was known as No. 290, i.e. her number in the builders' yard. The crown law officers advised detention with a view to submission of the question to a court of law. Being apprised of the Gov.'s intention, the still incomplete A., on the pretext of making a trial trip, steamed down the Mersey and out to sea on July 29, 1862. She made for the Azores, where, under the direction of her commander, Capt. Semmes, she was equipped with arms and ammunition. Thus armed she sailed forth on Aug. 24. In all she captured some 68 vessels and inflicted direct damage to the extent of nearly £1,000,000. Finally, on June 19, 1864, the Federal warship *Kearsarge*, commanded by Capt. Winslow, caught the A. off Cherbourg, and after an hr.'s engagement, in which the latter vessel was reduced to a sinking condition. Capt. Semmes surrendered. The prolonged negotiations between this country and the U.S.A. eventuated in the treaty of Washington, 1871, by which it was agreed to refer the dispute to a court of 5 arbitrators, one each to be nominated by England, U.S.A., Italy, Switzerland, and Brazil. This court sat at Geneva in Dec. 1871, and awarded the U.S.A. £3,229,166, in respect of damage done by the A. and 2 other vessels, the *Florida* and the *Shenandoah*. The question is discussed in most works on International Law. See J. W. Dwinelle, *American Opinions*, 1870; M. Bernard, *Neutrality*, 1870; G. W. Lowrey, *English Neutrality*, 1863.

**Alabama River**, 315 m. long, rises in the state of Georgia. It flows through Montgomery, the cap. of Alabama, and unites with the Tombigbee to form the Mobile, a short riv. which flows into Mobile Bay, on which is situated the tn. of Mobile. It drains the greater part of the state of A.

**Alabaster**, a term applied to 2 different minerals. The A. of the ancients is said



to have derived its name from the tn. of Alabastron in Egypt. It is a hard, marble-like carbonate of lime formed by a stalagmitic process, and was in much demand for ornamental purposes. The 'alabaster box of very precious ointment,' mentioned in Matt. xxvi. 7, was made of this substance.

The A. of the present day is gypsum (*q.v.*), a hydrated sulphate of lime. It is a much softer mineral than the anct. A. and slightly soluble in water, but it is used for making ornaments, statuettes, etc.

**Alagoas:** 1. A state of Brazil, bounded on N. and N.W. by Pernambuco, of which it was originally part, on S.W. by Sergipe, and on the S.E. by the Atlantic. It has an area of 22,580 sq. m., and a pop. of about 980,000. The soil is fertile, and the country well watered, but agriculture is only sparingly carried on owing to the deadly climate. The chief products are sugar, tobacco, coffee, and cotton. Maceio is the cap. 2. Tn. in state of same name, near the coast, on Lake Mangaba. Formerly the cap. of the prov. Pop. 19,000.

**Alais (Alès),** tn. in dept. of Gard, France, on It. Gardon, 23 m. N.W. of Nîmes. It is situated on a productive coalfield, and has manufs. of silk, glass, and iron. A. sided with the Huguenots in the seventeenth-century religious wars, and was taken in 1629 by Louis XIII. and Cardinal Richelieu. A treaty signed here in the same year ended the war. Pop. 42,000.

**Alajuela,** cap. of prov. of same name, Costa Rica, 15 m. N. of San José. The centre of an important coffee and sugar dist., and the headquarters of many revolutionary outbreaks. Pop. 11,700 (prov.) 124,000.

**Alaleona, Domenico** (1881-1928), It. musical composer, b. in P'ceno. Won a place amongst modern It. musicians as a national composer of marked originality. His *Canzoni italiane* and *Laudi italiane* are collections which revive the songs of his people and make an attempt to reconstruct a basis for the symphony and for modern instrumental music. A. also contributed some important studies of It. musical hist.; his book (*Studi sulla Storia dell' oratorio musicale in Italia*, 1908, 1945, contains much valuable research.

**Alamanni, or Alamans,** see Alemanni.

**Alameda,** a residential city in Alameda co., California, 6 m. from San Francisco. Pop. 36,000.

**Alamo,** the 'Thermopylae of America,' originally a Franciscan mission, but used at the end of the eighteenth century as a fort. In the Texan War of Independence (1836) a party of Texans and Amers. numbering 180 held it against a large number of Mexicans under Gen. Santa-Anna. Continued assaults were repulsed from Feb. 23 to Mar. 6, when the Mexicans, having lost over 400 men, reduced the garrison to 5. These were captured and put to death by order of Santa-Anna.

**Alamos, tn.** in state of Sonora, Mexico,

125 m. N.W. of Sinaloa. The tn. is in the centre of an important silver-mining dist. Pop. 3000.

**Alanbrooke, Sir Alan Francis Brooke,** first Viscount (b. 1883), Brit. soldier, b. at Bagneres de Bigorre, France, son of Sir Victor Brooke, of Co. Fernanagh, Ireland. Educated abroad and at the Royal Military College, Woolwich, passing out into the R.F.A. 1902. Went to France in 1914 with the Secunderabad Cavalry Brigade. Adjutant, 2nd Indian R.H.A. Brigade, 1915; G.S.O.I.R.A., 1st Army, 1918. Commandant, School of Artillery, 1929-32; Army Instructor, Imperial Defence College, 1932-34; Commander, 8th Infantry Brigade, 1934-35; Inspector, R.A., 1935-36; Director of Military Training, War Office, 1936-37; Commander of Mobile Div., 1937-38; G.O.C. in Chief, Anti-aircraft Command, 1939; G.O.C. in Chief, S. Command, 1939-40; Commander of Second Army Corps, B.E.F., 1939-40; Commander-in-Chief, Home Forces, 1940-41. Chief of the Imperial General Staff, 1941-46. Field Marshal, 1944.

**Aland Is.** See AALAND ISLANDS.

**Alaouites (Alawites), Territory of the,** a dist. of Syria created by France as mandatory when pre-war Syria was partitioned into sev. states. In 1921 the then newly formed state of the A., together with those of Damascus and Aleppo, were made into a Syrian federation, but 3 years later the A. became a separate regime under a Fr. governor. See also SYRIA.

**Alarcón, Juan Ruiz de** (1588-1639), a Sp. dramatic poet, b. in Tlaxco, Mexico, d. in Cordova, Spain. He graduated in Mexico in 1606, and in 1622 went to Spain to fill a position under the council of the Indies. In 1628 his first vol. of 8 dramas was pub. at Madrid. The second vol. of 12 plays appeared at Barcelona in 1635. His work includes heroic drama, character-plays, and comedies of intrigue, and ranks very high in Sp. literature. His best-known play is *La verdad sospechosa* (imitated by Corneille in *Le Menteur*). Others are *Las pinedas oyen*, *El tejedor de Segovia*, and *Todo es ventura*. He received little contemporary appreciation, and treated his rivals and the public with great scorn.

**Alarcón, Fernando de,** a Sp. navigator in the sixteenth century. In 1540 he sailed from Acapulco to support the expedition under Vasquez de Coronado in search of the 7 cities of Cibola (Mexico). By exploring the gulf of California he proved that California was not an is. He also ascended the Colorado R. A report of the expedition occurs in Hakluyt's *Voyages*, and the earliest known map of the region was made by Castillo, one of his pilots. See Herrera, *Decade VI*, bk. ix., and Hakluyt's *Voyages*.

**Alarcón, Pedro Antonio** (1833-91), a Sp. novelist and statesman, b. at Guadix, d. at Madrid. He was intended for the Church, but soon took up journalism, writing for the *Eco del Occidente* of Cadiz, and after the revolution of 1854 editing *El Luligo*. He accompanied the Moroccan

campaign of 1859 as a correspondent, publishing in 1860 an excellent diary of his experiences. In 1864 he entered the Cortes as Liberal member for Cadiz, and later filled many important posts, including deputy member of council of state and ambassador. His short stories, poems, and essays were collected under various titles in 1871, 1875, and 1883. His later novels, many on religious subjects, were not so popular as his sketches and studies of rustic Spain. Among his works are: *Diario de un testigo de la guerra de Africa*, 1860; *Poesías serias y humorísticas*, 1870; *Cosas que fueron*, 1882.

**Alaric I.**, a great Visigothic chief of the fourth century. In 394 he commanded the Gothic allies of Theodosius against Eugenius. At the death of Theodosius in 395 he left the Rom. service, having become king of the W. Goths, and invaded Greece in 396. In 397 Stilicho drove him back to Epirus. In the same year Arcadius made him governor of Illyricum. In 400 he invaded Italy, but was defeated by Stilicho at Pollentia and Verona in 402. He then made a treaty with Honorius, but this having been broken, besieged Rome, and captured and sacked it in 410. He died in that year at Cosentia.

**Alaric II.**, king of the Visigoths, 484-507. He succeeded Euric to an extensive kingdom, and during most of his reign was at peace with the Franks. He was a wise and tolerant ruler, and ordered the compilation of the *Breviarium Alaricianum*, a selection from Rom. legal writers, for the use of his governors. His prosperity ultimately brought him into conflict with the Frankish king Clovis, who, on a religious pretence, made war upon A., whom he defeated and killed at Poitiers. See **GOths** and **VISIGOTHS**.

**Alarodian Languages**, the name applied by many philologists to the Caucasian group of languages, of which Georgian is the chief. The term is derived from the Alarodii of the classical geographers. See *De Brosset's Éléments de la langue géorgienne*, 1837, and *Sayce's Introduction to the Science of Languages*, 1880.

**Ala-Shan**, a prov. of S. Mongolia, occupying the S. part of the Gobi Desert. It is about 300 m. long and 480 m. wide, and is very sparsely inhabited by Oluts, the pop. being about 20,000. The dist. is an arid sandy plain, with occasional low hills and chalk downs. A little grazing is done where the absence of saline deposits permits. To the E. is the Ala-Shan, or Khara-Narim range, reaching 11,000 ft. The prov. was annexed by China in 1836.

**Alashehr**, a tn. of Asiatic Turkey, on the slope of Mt. Tmolus, 75 m. E. of Smyrna. It is the seat of a Gk. archbishopric, and has a considerable trade. It contains numerous remains of sculpture, and is supposed to be the scriptural Philadelphia. Pop. 40,000.

**Alaska**, ter. of U.S.A., occupies the extreme N.W. corner of N. America, with the adjacent is., being bounded on the N. by the Arctic Ocean, on the E.

by the Yukon dist. of Canada and Brit. Columbia, on the S. by the Pacific Ocean, and on the W. by Bering Sea and Straits. It was formerly known as Russian America. It has an area of 590,884 sq. m., and a pop. of 60,000, of whom nearly 28,000 are whites and the remainder chiefly Indians, with a few hundred Jap., Negroes, and Chinese. There is a floating pop. of 20,000 (excluded from the above) employed in the mines, on the railways, and in the canning industry. The country may be divided into 4 dists. The Pacific mt. belt, along the S. coast, contains 4 ranges, the Coast, the St. Elias, the Aleutian, and the Alaskan, apparently a continuation of the Coast Range of W. America. Sev. lofty peaks are found here, including Mt. Sanford, 16,200 ft.; Mt. St. Elias, 18,024 ft.; Mt. McKinley, 20,300 ft.; and Mt. Foraker, 17,000 ft. This dist. comprises the basins of the Copper and Sushitna Rs. The coast is deeply indented and precipitous, and bordered by numerous is. The Central Plateau, at an average elevation of 3000-5000 ft., is a rolling upland with deep channels trenched by rivs., the chief of which are the Yukon and the Kuskokwim. The Rocky Mt. system, which enters A. as a wide belt comprising sev. ranges, with peaks of 7000 and 8000 ft., merges into the Endicott Range, and dies away towards the Arctic Ocean. The Arctic slope, divided into the Anaktuyuk Plateau and the featureless coastal plain, is as yet very little known. But in 1938 a Harvard Univ. expedition led by Bradford Washburn discovered, during aerial reconnaissance, a huge inland icefield, which is now computed to be nearly 250 m. long and to be the source of the huge glaciers of A., such as the Bering glacier (30 m. wide) and the Malaspina (50 m. wide). The icefield is hemmed in by a maritime mt. range, whose peaks range from 10,000 to nearly 20,000 ft. above sea-level. This range extends from the Copper R. valley above Cordova to the Alek R. valley in the Yukon. The rivs. of A. are large, numerous, and navigable. The great system of the Yukon falls into the Behring Sea. The N. rivs. are comparatively unimportant. The chief industries of A. in the past have been fish and fur. The salmon fisheries are very fine. Whaling has lately fallen off considerably. The fur trade, comprising seal, sea-otter, and sev. varieties of fox, is also on the decrease. Reindeer have been brought in from Siberia, and there are now upwards of 400,000 head in the country, yielding an increasing tonnage of reindeer meat for export. The number of foxes is also increasing, and the value of fur-bearing animals exported reaches \$175,000 a year. Salmon-fishing is an important activity, and there are adequate stringent laws for the protection of the fisheries, on which some 30,000 persons are employed, the majority being engaged in salmon-canning. There are also valuable fur-seal herds on the Pribilof is., the estimated number of

animals being close on 800,000. Agriculture suffers from the shortness of the summer, but the soil appears to be rich, and experiments go to show that numerous hardy vegetables and sev. cereals may be grown in many parts of the country, while the abundance of grazing grasses offers possibilities of pastoral development. The timber resources are still untouched. The mineral wealth of A. has only lately been exploited. Gold was first found in 1861, and prospecting has gone on ever since, though as yet no veins of the richness of the Klondyke



S. &amp; G.

#### THE OLD PIONEER ROAD

A section, later abandoned, of the Alaska Highway, near Champagne, Yukon.

deposits have been found. Gold is worked chiefly in S.E. A., where a low-grade ore is found, on the Yukon R., and on the W. coast. Copper, silver, coal, lignite, gypsum, and marble are also mined. A. trades almost exclusively with the U.S.A., and to the Amer. N.W. states and Seattle the trade is an important one. During the decade 1931-1940 the value of A.'s shipments and outshipments (including gold and silver) was 951,000,000 dols. The range of climate is considerable. It has short, very hot summers and long, severe winters. The seat of gov. is at Juneau (4000); other important tns. are Ketchikan, 3800; Anchorage, 2300; Sitka, 1200; Fairbanks, 2100; and Nome, 1200. There are some 18 incorporated tns.; most of them are equipped with all modern advantages, such as electric lighting, and, in some

cases, an up-to-date means of water supply. The best harbour along the W. coast is at Teller on Port Clarence, near the W. tip of Seward Peninsula. A. was discovered by Vitus Bering (q.v.) in 1741. In 1867 it was purchased from Russia by the U.S.A. In 1906 A. received power to elect a delegate to the U.S. Congress. In 1912 a law was passed by the Congress conferring legislative power on A. and constituting Juneau the cap. of the ter.; it also created a railroad commission. The rail route from Seward to Fairbanks, projected in 1915, is now open, and the system comprises altogether 500 m. of track and connects the terminus with the coal-fields at Malanuska. The U.S. Gov. has secured the consent of Canada for a railroad survey of a line connecting the Canadian National railroad with the Alaskan railroad. The route extends from the vicinity of Prince George, Brit. Columbia, via the Rocky Mt. Trench to an intersection with the Alaskan railroad S.W. of Fairbanks. There are 4 national and over a dozen territorial banks, the total deposits of some 7,000,000 dols. The Gov. of A. is charged with the education of the whites, while education of the native elements is in the hands of the Alaskan div. of the National Bureau of Education. There is also an agric. college and school of mines at Fairbanks.

*Boundary Commission, 1903.*—The dispute between the U.S.A. and Canada began with a treaty between Russia and Great Britain in 1825, which laid down a boundary line for that part of the deeply indented coast which runs up from the Portland canal to Mt. St. Elias, embracing a narrow strip of coastline and the Alexander Archipelago; this line, which was to follow 'the tops of the mountains parallel to the coast, to meridian 141,' limited the strip to 10 marine leagues from the coast, following the windings of the coastline. In 1867 the U.S.A. purchased the Russian-Alaskan Company's ter., and then followed a period of disputes between Canada, the U.S.A., and Great Britain on the question whether the international line was to go across or round the indentations of the coast. An attempt to settle this dispute by a joint high commission in 1897 broke down, but in 1903 it was agreed to decide the question by a commission of 6 'impartial jurists' from Canada, U.S.A., and Great Britain. The commissioners were Lord Alverstone, Lord Chief Justice of England, Sir J. Jette, Mr. A. B. Aylesworth, of Canada, lawyers of repute; and Senator H. C. Lodge, Hon. Elihu Root, and Senator G. Turner, of the U.S.A. The decision, not signed by the Canadian representatives, favoured the Amer. contentions, giving Canada no access to the inlets down to the Portland canal, and only 2 of the is. claimed. In Canada much feeling was aroused against Lord Alverstone's vote as being dictated by Brit. policy in regard to the U.S.A., but the award has since come to be looked upon in Canada as a good workable compromise. See a series of articles in 1908-9 in the *University Magazine* of

Montreal. At the end of 1938, the Brit. Columbia Legislature voted 25,000 dols. for a preliminary survey of a proposed highway connecting A. with the U.S.A. through Brit. Columbia. The President of the U.S.A., at the same time, appointed a commission to study routes and costs. (see next section).

**The A. Highway.**—The A. Highway was opened on Oct. 29, 1942. It is 1671 m. long, and runs from Fort St. John, Brit. Columbia, following the general line of the airports which Canada had constructed at Fort Nelson, Watson Lake, and Whitehorse, and thence via Boundary and Big Delta to Fairbanks. The highway links A. and the U.S.A. There has been much joint effort between Canada and the U.S.A. for the development of A., particularly in relation to Brit. Columbia. On Jan. 23, 1943, the joint economic committees of the 2 countries undertook an international study of the vast region comprising A., the Yukon, and parts of the N.W. Ters. and Brit. Columbia. This followed other co-operative action, particularly the setting up by President Roosevelt and Mr. McKenzie King of a joint defence board, and later various other joint boards were set up in the economic field. The major aspect of this great joint effort was the programme for the defence of A. and its use as a base for offensive action against Japan. The Defence Board recommended and Canada constructed a long line of air bases uniting the interior of the continent with the advanced posts in A. and N. Brit. Columbia. The construction of the airway to A. presented a problem of supply which could be effectively solved only by the building of a road and the A. Highway was constructed by U.S. Army engineers and Canadian and Amer. contractors with altogether remarkable speed. An offshoot from the A. Highway was plotted from Champagne to the deep-water landing at Haines on Lynn Canal, thereby greatly enhancing the usefulness of the highway as a channel of distribution. Canadian airmen, operating from Alaskan bases, attacked Jap. shipping and installations in the Aleutians. The last link in the A. Highway from the N.W. tip of the N. Amer. continent to the Panama canal is under construction by the Amer. Gov. from the S. frontier of Mexico to Panama. The Highway forms part of the Inter-Amer. Highway extending for 16,800 m. from A. to Argentina. Numerous countries are involved in the road, which runs from Fairbanks (A.) through Brit. Columbia to Seattle, and leaves the U.S.A. at Laredo (Texas). The A. Highway also formed a 'N.W. passage' along which were transported vital supplies to Russia via the Bering Straits. See Benjamin H. Kizer, *The U.S.-Canadian Northwest* (Princeton), 1943.

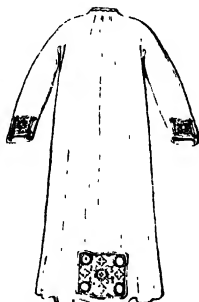
**Alauda** (Lat., lark), belonging to the family Alaudidae of the Passeriformes, is a gregarious bird. The wings are broad and long, the tail is short, the head-feathers may form a crest. *A. arvensis* is the skylark, *A. arborea* the wood-lark.

**Alausi**, tn. on A. R., prov. of Chimborazo, Ecuador, 70 m. E. of Guayaquil. It is situated on a plateau of the Andes. Pop. 7000.

**Alava**, the largest and most southerly of the 3 Basque provs. of Spain, having an area of 1205 sq. m. and a pop. of 105,700. The cap. is Vitoria. Contains the valley of the Ebro, and much of the Cantabrian Range.

**Alawites**, see ALAOUTES.

**Alb**, a liturgical vestment of the Catholic Church, consisting of a white linen tunic with narrow sleeves and a hole for the head, and ultimately derived from the *tunica alba* of Rom. citizens.



Originally plain, in the tenth century embroidered bands were employed for borders and cuffs, and later 'apparels,' i.e. square patches of ornamentation, 4 or 5 in number, were used. Als. have reappeared in the Anglican Church with the ritual revival.

**Alba**, tn. in Cuneo, Piedmont, Italy, on R. Tanaro, 31 m. S.E. of Turin. It is the anct. Alba Pompeia, and contains numerous remains of anct. It. life, together with a fifteenth-century Gothic cathedral. Pop. about 9000; commune 18,300.

**Alba**, Duke of, see ALVA.

**Albacete**, cap. tn. of prov. of same name, Murcia, Spain, 134 m. S.E. of Madrid. Pop. 42,000. Has a considerable trade in cutlery and an annual cattle-fair. The prov. has an area of 5972 sq. m. and a pop. of about 334,400. The W. part is mountainous; the rest a tableland.

**Albaore**, see ALBICORE.

**Alba-Iulia**, or Alba Julia (Ger. Karlsburg), a tn. of Transylvania, 50 m. S. of Cluj. It has an old hist. and is built on the site of the Rom. colony of Apulum. A bishopric was founded there by Ladislaus I. in the eleventh century, and it is still the seat of a Rom. Catholic bishopric with a cathedral which contains the tomb of John Hunyadi. An interesting feature is the citadel which was built in the early eighteenth century by the Emperor Charles VI. In 1918 the union of Transylvania with

Rumania was proclaimed here. Pop. 12,000.

**Alba Longa**, an anct. tn. of Latium, Italy, on a ridge overlooking the Alban Lake, 15 m. S.E. of Rome. Said to have been founded by Ascanius, son of Æneas. Sev. generations of kings lived here, and it was the bp. of Romulus and Remus and the centre of the Lat. League. Destroyed by Tullus Hostilius, third king of Rome, and never rebuilt.

**Alban, St.**, the protomartyr of Britain, b. at Verulamium (now St. Albans) in the third century, and converted to Christianity late in life. He suffered martyrdom by the sword about 304. King Offa founded the famous monastery of St. Albans on the site of his birth or death in 795. The Rom. Church keeps his festival on June 22, and the Anglican on June 17.

**Albani**, a rich and famous Rom. family, coming originally from Albania and settling at Urbino in the sixteenth century. The fame of the house began with the accession of Giovanni Francesco A. to the papal throne in 1700, since when numerous members have been cardinals and other high church officials. Cardinal Alessandro A. (1692-1779) formed the celebrated art collection at the Villa A. at Rome, which was depleted by the Fr. The family died out in the nineteenth century.

**Albani, Francesco** (1578-1660). It. painter of the Carracci school, b. at Bologna, and d. there. He painted numerous altar-pieces, but preferred mythological or pastoral subjects. His 12 beautiful children served as models for many of his most famous paintings, now at Rome, Dresden, and in the Louvre. Opened a Rom. academy.

**Albani, Dame** (1851-1930), stage name of Marie Louise Emma Cecile Lajeunesse, a Canadian singer, b. at Chambly, Quebec. Trained in music by her father, who first appeared in public at Albany, New York, in 1863. After studying in Paris and Milan, she made her debut at Messina in 1870 as Amina in *La Sonnambula*. In 1872 she appeared in London with the Royal It. Opera, later visiting Paris (1872), U.S.A. (1874), St. Petersburg (1878), Berlin (1884), etc. In 1878 she married Ernest Gye, a theatrical manager. She later left opera for oratorio, and sang at all the chief festivals and before many European monarchs. On the eve of her retirement in 1911 she pub. her reminiscences, *Forty Years of Song*, and at her farewell concert at the Albert Hall received a purse of gold. In 1925 she was given a Civil List pension, and created a Dame of the Order of the Brit. Empire. In her 40 years' career she appeared in every role it is possible for a singer to fill: oratorio singer, operatic artist, and, later, ballad singer. Sir Arthur Sullivan's setting of her *Golden Legend* was inspired by her voice, and Gounod composed his *Mors et Vita* as an especial tribute to her.

**Albani, Matthias**, the name of 2 celebrated Tyrolean violin-makers. The father (1621-73) was b. at Bozen and was

taught by Stainer. The son studied the art of violin manuf. at Cremona and afterwards settled at Rome. The instruments he made between 1702 and 1709 are especially fine and considered by some the equal of Amati's.

**Albania**, an independent Balkan state made up of parts of the old Turkish provs. of Scutari, Yanina, Kosovo, and Monastir. Prior to 1939 it was a democratic monarchy which, before 1912, formed a part of the Turkish Empire. It consists of a very mountainous strip of land lying on the W. shore of the Balkan Peninsula, between Montenegro and the N. boundary of Greece. It is little explored and, probably owing to its rugged features and unsafe roads, remains unattractive to the traveller. The mts. of N. A. form the watershed between the Ægean and the Adriatic Seas; they consist of a high mass of rocky mts. which spread through Montenegro to the Adriatic. The highlands of A. may be described as lying in the N. and S., the mts. of central A. being of a more undulating character. Owing to the character of the mts., the rvs. which flow from E. to W. are not navigable. The chief rvs. are the Boyana and the Drin. The mineral wealth of A. is probably great, but the country is almost entirely unexploited. It has splendid forests, and produces wine and olive oil. The chief means of subsistence are cattle-rearing in the plains, sheep- and goat-rearing in the mts. The pop. of A. is roughly estimated at about 1,600,000. The chief tns. are Tirana, Scutari, and Yanina. As a race the Albanians are one of the most anct. in the Balkan Peninsula; they are noted for their sturdy independence and for the tenacity with which they have clung to their customs and traditions. The majority of the Albanians are Moslems, the remaining portion of the pop., roughly two-fifths, belong either to the Gk. or the Rom. Catholic Church. A number of interesting Rom. remains prove the existence of a Rom. influence in A. Two ports, the present Pöllina (Roin. Apollonia) and Durazzo (Rom. Dyrrachium), on the Adriatic coast, must have been thriving tns. during the days of Rom. authority, but have now fallen into disuse. The medieval hist. of A. is as interesting as it is varied. During the fourth and fifth centuries it was in the hands of the Goths, in the sixth century it again became part of the E. Empire under Justinian, and in the following century came under the sway of the Serbians, who held it, with a short break, until the fourteenth century. In the twelfth century for a short period the Normans, under Robert Guiscard, tried to form a kingdom there, and Michael Comnenus, after the settling up of the Lat. Empire, retired thither and tried to build up an independent kingdom. During the later portion of the thirteenth and the beginning of the fourteenth century the Angevin kings of Sicily ruled also the kingdom of A. The Serbians, however, re-estab. their power in the twelfth century and retained it until the

death of Dushan in 1360. Between the downfall of Serbian rule and the establishment of Turkish power, A. was ruled by native chieftains. During the fifteenth and sixteenth centuries, however, in spite of brave and prolonged resistance, A. gradually fell into the hands of the Turks. In the eighteenth and early nineteenth centuries attempts were made by individual Moslem chieftains to establish their independence in A., but with the fall of Ali Pasha in 1822 these attempts practically came to an end. At the conclusion of the Balkan war (q.v.) the treaty of London settled the independence of A., May 1913: a ruler was to be chosen by the powers, and, in Nov. 1913, Prince William of Wied (q.v.) was invited to take up that office. On Feb. 19, 1914, he notified the powers of his acceptance, and before entering upon his duties paid visits to the princely courts of Europe; these visits were not unconnected with the floating of a loan of £3,000,000 which was required to set up gov. in A. On Feb. 21, 1914, Prince William received at Scutari an Albanian deputation, consisting of Essad Pasha (q.v.) and a number of Albanian chieftains, who offered him the crown on behalf of the Albanian people, which he accepted. His position was beset with many difficulties, not least among which was the question of N. Epirus, where a revolt took place on his arrival in A. He was known in A. by the title of Mpret (said to be a modification of Imperator). It was evident, on the outbreak of the First World War, that there was no stability in this arrangement of a petty principality created by the influence of Germany with the object of furthering Austro-Hungarian policy in the Balkans. In Dec. 1911 Italy dispatched an expedition to Avlona on the Albanian coast as a set-off to Austrian aggrandisement in Serbia. The Entente in 1915 promised A. to Italy as part of the price of It. support in the war. Unaware of this, the Dual Monarchy, in the endeavour to purchase It. neutrality, offered Italy sovereignty over Avlona and a free hand in A. Later in 1915, however, after the Montenegrin cap. had fallen, the Austrians, under Gen. von Kovesse, marched southward into A., captured Scutari, and reached the heights of Tirana (Jan. 1916). Meanwhile Bulgarian troops had also crossed the frontier and occupied El Bassan. This double invasion overwhelmed Essad Pasha, the pro-ally head of the provisional Albanian Gov., with the result that the Its. evacuated Durazzo, but continued to hold Avlona, and so dominated S. A. Strategically, however, the advantage lay with the Central Empires, who had now safeguarded the then new Ger. railroad connection with Constantinople. After the armistice, the settlement contemplated the transfer of S. A. to Greece, Italy being acquiescent. provided Greece recognised an It. protectorate over the greater part of the country subject to a small northerly strip being ceded to Serbia.

Finally, however, at the conference in San Remo, 1920, A. was only mandated to Italy. Later, a republic was proclaimed with a constitution providing for a Parliament of 54 elected members and a Senate of 18 under a president (Ahmed Zogu or Zog, 1925). In 1927 Italy signed with A. a treaty of friendship and arbitration. In 1928 the Constituent Assembly proclaimed A. a democratic monarchy, Ahmed Zogu assuming the title of Zog I., King of the Albanians. In 1931 King Zog seemed to be following a policy largely independent of It. control, while accepting It. assistance in the modernisation of A., but an attempt at his assassination in that year compelled him to abandon that attitude, especially as he was convinced that the crime was inspired by Yugoslavs. In 1939 Italy suddenly invaded A., after air raids over the chiefs. King Zog fled the country and, soon afterwards, the country was proclaimed an It. protectorate. The It. move was generally interpreted as part of the Axis policy of encircling Yugoslavia, and also designed to give Italy still greater influence in the Mediterranean. In some quarters, however, the occupation was thought to have been actuated by It. fears of Germany's encroachment southward—the It. invasion following, indeed, closely on the Ger. seizure of the already truncated Czechoslovakia. In the course of the It. invasion of Greece in 1940 the Gks. captured various strategic points in A. and, but for Ger. intervention, would probably have driven the Its. out of the Balkans. In 1942 the premier of the Albanian 'puppet' gov. of A. announced a programme for complete 'fusion' of the Italo-Albanian union, indicating that A. would be entirely absorbed into the It. Empire. But the patriot forces eventually entered the cap. on Nov. 20, 1944, and Durazzo was liberated the following day, A. thereby regaining her independence. After the Second World War the Allies decided to reorganise the administration on representative lines. A. was declared an independent republic on Jan. 11, 1946. See BALKAN WAR, SCUTARI, and SERBIA. See J. C. Hobbhouse, *Journey through Albania*, 1813; M. Edith Durlam, *High Albania*, 1909; C. A. Chekrezi, *Albania Past and Present*, 1919; R. W. Lane, *Peaks of Shala*, 1924; R. Matthews, *Sons of the Eagle: Wanderings in Albania*, 1937; Julian Amery, *Sons of the Eagle: A Study in Guerrilla War*, 1948.

**Albano**, the name of a tn., lake, and mt. of Italy. The tn. lies 12 m. S.E. of Rome on the Via Appia, and is celebrated for the beauty of its scenery. Pop. 11,700. The lake and mt. lie 13 m. S.E. of Rome. The lake is 6 m. in circumference, and the mt. rises a little over 2000 ft. above the lake. The campanile of the cathedral was shelled and the church of S. Silvestro was badly damaged in the Second World War.

**Albans**, St., see St. ALBANS.

**Albany**, a Canadian riv. It rises in

Lake St. Joseph and flows into James Bay. Its total length is 500 m. It is navigable up to Martin's Falls. Fort A. stands at its mouth.

**Albany:** 1. The co. tn. of A. co. and cap. of the state of New York, U.S.A.; situated on the W. bank of the Hudson R. The first settlement was made here in 1614 by the Dutch, who called the place Fort Nassau. In 1664 it was occupied and named by the Eng. In 1754 there was held here the general conference of the states, in which plans for a closer union were mooted. It played an important part in the Amer. war of independence, and became the state cap. in 1797. It has a number of magnificent public buildings, among which may be mentioned the state capitol (1879), the costliest in the U.S.A., the city hall, the Federal Building, and the state museum of natural hist. The capitol was partially destroyed by fire in Mar. 1911, and many valuable documents were destroyed. It is an important railway and commercial centre. It has breweries, stone factories, cotton mills, clothing factories, and iron and brass foundries. Pop. 130,500. 2. The co. tn. of Dougherty co., Georgia, U.S.A., at the mouth of the Kinchafoona R., on the Flint R. Settled in 1836, and became a city, 1907. Pop. 19,000. 3. The co. seat of Linn co., Oregon, on the Willamette R. Manufs. wagons and furniture, and exports flour and grain. Pop. 5300. 4. The co. seat of Gentry co., Missouri; residential tn. and seat of Central Christian College (opened 1892). Pop. 3000.

**Albany**, situated in the co. of Platangeton, W. Australia, on the Princess Royal Harbour, 254 m. S.S.E. of Perth. Pop. 4000. Possesses the finest harbour in W. Australia. First settled as a penal colony in 1826, it became a municipal tn. in 1871.

**Albany**, Count, the assumed name of the 2 brothers John Sobieski Stolberg Stuart (1797-1872) and Charles Edward Stuart (1799-1830), who claimed to be descendants of the young pretender. Both served on the Continent under Napoleon till his final defeat, and then settled successively in London, the Scottish highlands, and Austria.

**Albany**, Dukes of, title created first in 1398 and bestowed on Robert Stewart, earl of Fife. The title has been revived at various periods in Brit. hist., being conferred on Darley by Mary Queen of Scots in 1565, held by James I., Charles I., and James II., again bestowed on the youngest brother of George I., on the younger brother of George III., and on the second son of George III. It was finally revived in 1881 by Queen Victoria for Prince Leopold (q.v.).

**Albany**, Leopold George Duncan Albert, Duke of (1853-84), the youngest son of Queen Victoria. He was known as Prince Leopold until created duke of A. in 1881, and he married Princess Hélène of Waldeck-Pyrmont, 1882. He was a liberal patron of literature and education. Always delicate, he d. at Cannes at 31 after a very short illness.

**Albany**, Louise Maximilienne Caroline, Countess of (1752-1824), the eldest daughter of Prince Gustavus Adolphus of Stolberg. Married to the young pretender in the days of his decline, her marriage proved most unhappy. In 1780 she fled from her husband and threw herself on the protection of Henry Stuart, her brother-in-law. She then lived quietly and happily, interesting herself in literature. In 1788 she was released by the death of Charles Stuart, and is said to have married the poet Alfieri. She visited England and the Eng. court, and was well received.

**Albategnius** (or **Al-Battani**), properly Mohammed ben Gebir ben Sinan al Battani, his surname being taken from his native tn. Battan in Mesopotamia (c. 850-929), an Arab chief and astronomer who, while following in general the Ptolemaic system, made sev. improvements thereon. His astronomical treatises were trans. into Lat. by Plato Tiburtinus early in the twelfth century, and printed at Nuremberg in 1537 and in 1645.

His writings comprise abridgments of Ptolemy and Archimedes with comments, a work on astronomy, chronology, and geography, a treatise on the rising of the constellations and various other points in astronomy, and an elementary treatise on astronomy and astrology.

**Albatross** (probable modification of *alcatraz*, frigate bird, but wrongly applied to other sea-birds, and so altered to *albitross* or *albatross*, in reference to *albus*, white; the word is not found before about 1680) is the *Diomedea exulans*, belonging to the *Procellariiformes*, or petrels. It is web-footed, has a strong, hooked beak, and is white and grey in colour. It lays a single white egg in a rocky spot. It is noted for its graceful flight, and is the largest seabird, measuring 10 ft. across the wings. It feeds on fish, and its home is the S. Ocean.

**Albay**, a city and cap. of the prov. of A. in the Philippine Is. It is one of the most important cities of the Philippine group. Built at the base of the picturesque volcano of Mayon (last eruption 1888), it is in the centre of one of the great hemp-producing dists. Large quantities of hemp are shipped to Manila; cocoa, sugar, and copra are among other products. Pop. 53,000.

**Albedo**, an astronomical term applied to the degree of light reflected from the surface of a heavenly body, e.g. the A. of the moon is that part of the sun's light which it reflects. It is designated by a fraction representing the ratio of light reflected to that received, its size depending on the nature of the reflecting surface. The A. of Mercury is about 0.11; of Venus, 0.50; of Earth, 0.20; of Mars, 0.26; of Jupiter, 0.62; of Saturn, 0.52; of Uranus, 0.62; and of Neptune, 0.52.

**Albemarle**, Dukes and Earls of, a variant form of the Norman name *Animale*. The first earldom was created by William the Conqueror, who gave his brother-in-law Odo of *Animale* the lordship of the Isle of Holderness in Yorkshire. In 1180 William de Mandeville,

son of the adventurer of Stephen's reign, succeeded to the title by marriage. During the century following it was held in conjunction with the earldom of Devonshire, and towards the end of the reign of Henry III. it lapsed to the crown. Revived subsequently by the royal prerogative, it was conferred on Richard Beauchamp, earl of Warwick, in 1419, and in 1660 the earldom was raised to a duchy and conferred on Gen. Monk by Charles II. The newly created title became extinct in 1688, but was conferred in 1696 again as an earldom on Van Koppel, a trusted follower of William III. See also MONCK, GEORGE.

**Albemarle Sound**, a large inlet on the coast of N. Carolina, about 55 m. long, and with an average width of 10 m. It received its name from the duke of A. of Charles II.'s creation.

**Albenga**, a seaport of Liguria, Italy, in the prov. of Genoa, near the Mediterranean. In Rom. times it existed under the name of Albengaunum, and belonged to the tribe of the Ligures Ingauni. Pop. 11,200.

**Albéniz, Isaac** (1860-1909), Sp. pianist and composer, b. at Camprodon, Gerona. A musical prodigy, he learned the piano as a child, appearing in public at the Teatro Romea, Barcelona, when only 4. He led a picturesque life for some years as a concert-giver in N. and S. America, and later went to the Brussels Conservatoire, where he studied under the auspices of King Alfonso XII. He failed as a musical comedy impresario, but throughout his vicissitudes, including heavy losses in financial speculation, he was fortunate in receiving, at crucial moments, the protection and influence of the best advisers, including the comte de Morphy, the Sp. musicologist. In musical reform, A. was an innovator, and with him came into existence the 'new Spanish school': while his name as a piano-composer is known in all countries. As pianist, he was specially famous for his rendering of the clavichords, Bach, Chopin, and Schubert. Eventually he gave up the piano to devote himself to composition. His operas include *Pepita Jiménez*, *Henry Clifford*, and *Merlin*; and among his other works are the orchestral suite, *Catalonia*, and a great number of piano works. See *A Dict. of Modern Music and Musicians* (1924).

**Alberni**, seaport on W. side of Vancouver Is., Brit. Columbia, with a large trade in lumber. The name is also applied to the inlet on which it stands, being an extension of Barclay Sound. Pop. 1800.

**Alberoni, Giulio** (1661-1752), was b. near Piacenza. His father was a gardener, and he himself became connected with the Church merely as a vergier. He, however, afterwards took priest's orders and came to Rome. Here he attracted the attention of the duke of Vendôme, and by him was taken to Paris in 1706. He became Vendôme's secretary, and accompanied him to Spain. He helped in the arranging of

the Sp. king's marriage to Elizabeth Farnese of Parma, and was rapidly pushed forward by the queen. By 1715 he had raised himself to the position of Prime Minister of Spain. His internal policy included many salutary and much-needed reforms. He reorganised the army, and realised that the power of Spain depended very largely upon the size and state of her navy. He also reorganised finances, and threw open the trade with the Indies. By his invasion of Sardinia in 1718 he provoked the Quadruple Alliance (England, Holland, France, and the Holy Rom. Empire). This resulted in his downfall, and in 1719 he was forced to leave Spain. Until the death of Pope Clement XI. he remained in hiding, but on his death took part in the papal election. He was even put forward as a possible occupant of the chair of St. Peter in 1721. He became legate of Ravenna and later retired to Piacenza, where he founded on the site of an old lazaret hospital the A. seminary. At his death he left large endowments for his school. See *Lives of Bersani*, 1862, and S. H. Smith, 1943; also *Lettres intimes de J. M. Alberoni adressées au Comte Rocca*, ed. E. Bourgeois, 1892.

**Albert**: 1. A div. in the N. part of Cape Colony, bounded on the N. by the Orange R., by tribes of which it is intersected. Area, 2650 sq. m. Pop. 17,000. 2. Tn. (formerly Ancere) in France, dept. of Somme, 17 m. N.E. of Amiens. Pop. 9250. In the First World War the tn. was lost by Gen. Byng's army on Mar. 27, 1918, during the supreme Ger. offensive launched on Mar. 21. Lost by the Fr. to the Gers. in Mar. 1940 and regained by the Brit. forces in Aug. 1944. 3. Riv. of Australia, crossing N. Queensland and falling into the gulf of Carpentaria. 4. The name also belongs to a co. of New Brunswick, on the bay of Fundy; to sev. vils. in N. America; and to a riv. in Victoria (Australia) flowing into the Pacific near Port Albert.

**Albert**, pseudonym of Alexandre Martin (1815-?), a Fr. mechanic who took a prominent part in the revolution of 1848. After this he was associated with Louis Blanc on the provisional Gov. After a period in prison he was released, and last appears in the Commune of 1871, after which he sinks into obscurity.

**Albert** (1490-1568), a cadet of the house of Hohenzollern, was, by the support of Maximilian, created grand master of the Teutonic Order of Prussia (1512). He became a follower of Luther and one of the leaders on the political side of the Reformation. He secularised the estates of the Teutonic knights and changed the mastership into a dukedom, becoming duke of Prussia. He estab. Lutheran churches and appropriated monastic property.

**Albert, Archbishop of Magdeburg** (1490-1545), was the younger son of John Cicero, elector of Brandenburg. Entering the Church, he became in 1513 archbishop of Magdeburg, in 1514 he became elector of Mainz, and in 1518 a cardinal. By the use of the services of John Tetzel



in the sale of indulgences, he may be said to have been directly involved in the commencement of the Reformation. From his friendship with Ulrich von Hutten, hopes were held out that he would definitely throw himself on the side of the Reformation; but he definitely placed himself on the side of Catholicism. He was, however, constrained to grant a certain measure of religious liberty in his dominions, owing to the great strides which the Reformation made in Magdeburg. Towards the end of his life he became more intolerant of Protestantism.

**Albert, Archduke of Austria** (1559-1621), surnamed the Pious, was the third son of the Emperor Maximilian II. Brought up in the Sp. court, he became cardinal-archbishop of Toledo, and later viceroy of Portugal (1594-96). In the latter year he succeeded the Archduke Ernest as governor of the Sp. Netherlands. His work in the Netherlands was chiefly directed against the power of France; in 1596 he captured Calais, thus inflicting a severe blow on the Fr.; he failed, however, to retain Amiens and retired to the Netherlands. In 1598 he renounced his orders and married the Infanta Isabella, receiving the sovereignty of the Netherlands, and in 1609 concluded a truce with the Dutch.

**Albert (Albrecht), Duke of Württemberg** (b. 1865). Ger. military commander, son of Duke Philip. Became colonel-general, 1913; field marshal, 1916. Commanded Fourth Army in neighbourhood of Alsace-Lorraine till end of First World War. He married, 1893, the archduchess Margarete Sophie of Austria (d. 1902), and he is titular successor to the last king of Württemberg.

**Albert, Margrave of Brandenburg** (c. 1100-70). A., usually known as A. the Bear, was margrave of the N. Mark, situated between the N. courses of the Elbe and the Oder. Later he acquired Brandenburg, the beginning of the modern kingdom of Prussia, and since that time Brandenburg has usually played an important part in Ger. affairs. Sometimes in rivalry, sometimes in harmony with Henry the Lion, he was an important factor in the civilisation of N.E. Germany. It is important to notice that the progress of Christianity in Germany coincided with the acquisition of ter.; that missionary and soldier worked side by side. A. the Bear may be said to be the forerunner of Prussian greatness.

**Albert, Prince Consort** (1819-61). Albert Francis Charles Augustus Emmanuel, the second son of Ernest, duke of Saxe-Coburg-Gotha, was b. on Aug. 26. Educated under a private tutor, he showed great diligence and ability, and devoted himself to natural science. He also showed a great liking for painting and music. The idea of his marriage with his first cousin (Queen Victoria) was first mooted by Leopold I. of Belgium, and was opposed in England by William IV. Prince A. first visited England in 1836, and although no formal engagement was

mado, an understanding was reached by the 2 cousins. During the following years Prince A. completed his education, travelling in various parts of Europe, and in the latter part of 1839 a formal engagement with Queen Victoria was announced, which was followed by their marriage early in 1840 (Feb. 10). His position, however, was one of great difficulty and needed the utmost tact. He was made regent in 1840 in case of the queen's death; he helped the queen with advice in her political duties, and only after his death did the full value of the work he had done become apparent. His interest in the working classes and in the prosperity and well-being of Great Britain is now recognised by all. He was president of the Exhibition commission, and it was due to his suggestion that the Great Exhibition was held in 1851. Taken ill at the beginning of 1861, he was seized with typhoid and d. on Dec. 14.

**Albert, Prince of Bayreuth** (1522-57), surnamed the Warlike, or Alcibiades, was a son of Casimir of Bayreuth and a member of the Hohenzollern family. In 1541 he received Bayreuth as his share of the family possessions, and is sometimes referred to as the margrave of Brandenburg-Kulmbach, after the name of the chief tn. of his principality. His restless youth marked him out for a military life, and he took part in many campaigns, sometimes for, sometimes against the Emperor Charles V. He was noted throughout Europe for his bravery and deeds of valour. His attacks on Franconia led to the formation of a league against him, and he was ultimately defeated. He was put under the ban of the empire and fled to France, where he took service under Henry II., dying shortly afterwards.

**Albert, Prince of Mecklenburg** (d. 1412), was called to the throne of Sweden in 1364 by the nobility who had deposed King Magnus. After a long war, peace was re-established in Sweden in 1393, when A. consented to give up his claim to the crown. He then retired into Mecklenburg, where he d. Margaret of Walde-mar, widow of Haakon, king of Norway, succeeded him, and united the 3 N. kingdoms under one sceptre.

**Albert I.** (c. 1249-1308) was the son of Rudolf of Hapsburg, the founder of the great Hapsburg dynasty, and first emperor after the Interregnum. A. was not elected emperor on the death of his father, but was passed over by the electors, from motives of fear and jealousy, in favour of Adolf of Nassau. Adolf proved himself too weak to rule well, and was deposed and slain by the electors led by A. In 1298 A. was elected and crowned. During the 10 years that he reigned he followed an energetic and ambitious policy which resulted in the reduction of Germany to obedience and the well-being of the Ger. people. He decided the succession question in Hungary and in Bohemia, settling the latter country upon his eldest son Rudolf, and thus making Austria the greatest power on the E. frontier of Germany. He was

treacherously murdered by his nephew John.

**Albert II.** (1397-1439), king of Hungary and Bohemia, and duke of Austria, succeeded Sigismund as emperor of Germany in 1438. He held a great diet at Nuremberg, in which the vehemence or secret courts were suppressed. He *d.* the following year, as he was preparing to take the field against the Turks, who were ravaging Hungary.

**Albert III.** (1414-86), elector of Brandenburg, surnamed Achilles, was *b.* in Nov. Quite early in his life he distinguished himself as a warrior. On the death of his father he received the ter. of Ansbach and took his place as one of the leading Ger. princes. After a war against Nuremberg he was forced to recognise their independence. In 1470 he became elector of Brandenburg. In 1472 he finally brought Pomerania under his rule. In 1473 he handed over his possessions in Brandenburg to his son and retired to his Franconian possessions. He was one of the greatest and most ambitious of Ger. princes.

**Albert of Belgium** (1875-1934). He succeeded his uncle, Leopold II., on Dec. 17, 1909. In Oct. 1900 he married the Duchess Elizabeth of Bavaria, and had 3 children. The eldest, Prince Leopold, duke of Brabant (the present king), was *b.* on Nov. 3, 1901; his second son, Charles Theodore, was *b.* in Oct. 1903, and his youngest child and only daughter, Marie José, was *b.* in Aug. 1906. He was popular with his subjects and progressive in his policy. In the First World War he shared the hardships and vicissitudes of his armies during the Ger. invasion. To all the overtures of the Central Empires whose govts. promised to restore to him his kingdom as the price of deserting the Entente, he turned a deaf ear. When, in Oct. 1918, the Allies renewed their victorious advance on the W. front, his troops had swept, within a fortnight, from Dixmude to the suburbs of Ghent, and on Nov. 13 he formally entered that city, Antwerp on the 19th, and Brussels on the 22nd. In Feb. 1934 he was killed in a mountaineering accident in the Meuse Valley, 40 m. from Brussels. See 'Albert, King of the Belgians' in Lt.-Gen. Galet's *The Great War*, 1931.

**Albert the Bold** (1443-1500), duke of Saxony, spent much of his early life at the court of the emperor. He attempted to obtain the crown of Bohemia in 1471 on the death of George. In 1464 he and his brother Ernest ruled jointly the possessions of their father, but in 1485, by the treaty of Leipzig, a division was made, and Albert founded the Albertine branch of the Wettin family. He was a skillful soldier, and took part in a number of campaigns. He was made hereditary governor of Friesland in 1498 by the emperor, but while making good his title he died at Emden.

**Albert Canal**, Belgium, completed in 1939, links Liège with Antwerp and the Scheldt. Length, 79 m.

Albert Dürer, *see* DÜRER.

Albert Edward, *see* EDWARD VII.

**Albert Edward Nyanza**, *see* EDWARD, LAKE.

**Albert Hall**, a large circular hall in S. Kensington, London, used for public meetings, concerts, oratorios, etc. Its seating capacity is over 10,000. It is situated opposite the Albert Memorial (*q.v.*), and its building was completed in 1871. It has one of the largest organs in the world.

**Albert, Lake** (formerly **Albert Nyanza**) (native name, Mwutan Nzige), a large lake of Central Africa, 100 m. long and 25 m. broad, situated in the lower basin of a great rift valley. It is intersected by 2° N. lat. and 31° E. long. Its position, but not its dimensions, was ascertained by Baker in 1864. The true, or White Nile, issues from the N. end of this lake, near the place where, on the E., the Victoria Nile enters, bringing the overflow of Lake Victoria. It is connected with Lake Edward on the S. by the Semliki R.

**Albert Lea**, city of Freeborn co., Minnesota, U.S.A., is the seat of the A. L. College for women. It is the centre and market of a flourishing agric. dist. Pop. 10,200.

**Albert Medal**, a decoration given for gallantry in saving life, instituted by Queen Victoria in 1866, in commemoration of her late consort.

**Albert Memorial**, a monument erected in memory of Albert, the prince consort, husband of Queen Victoria, in Kensington Gardens. It was designed by Sir Gilbert Scott.

**Albert Park**, National park in the Belgian Congo, situated in the Lake Kivu dist. Covers 7,000,000 ac.

**Albert, Saint**, *see* ETHELBERT.

**Alberta**, a prov. of W. Canada, estab. with its present boundaries by the Dominion Parliament in 1905. It covers an area of 255,285 sq. m., and has a pop. of 822,000. Its S. limit is the U.S. boundary; on the E. 110° W. long. separates it from Saskatchewan; on the N. it is cut off from the N.W. Ter. by 60° N. lat.; while on the W. the Rocky Mts. separate it from Brit. Columbia. Except in the S., where irrigation is necessary, the prov. is well watered. Its 2 great rivs., the Athabasca and the Peace R., flow N. and N.E. respectively until they meet the Slave R. coming from Lake Athabasca. The Slave R. then flows into the Great Slave Lake, whence, as the Mackenzie R., it drains into the Arctic Ocean. The Saskatchewan (N. and S. branches), with its tribs., drains the S. of A. into Lake Winnipeg, and thence, under the name of the Nelson R., into Hudson Bay. There are many small lakes, but Lake Athabasca and the Lesser Slave Lake are the 2 most important.

In the N. and S.E. the country is level and sparsely wooded, in the S. and S.W. near the Rocky Mts. it is broken, hilly, and more wooded. The centre is well watered and timbered, and is the chief agric. dist. Wheat, oats, and barley are especially cultivated here, and mixed farming is prosecuted with success. The

chief industries, however, are ranching and farming, carried on particularly in the N. The sugar-beet is extensively cultivated and much fruit is grown. The climate is on the whole healthful and invigorating. Since the prov. extends over 11° of lat. it naturally varies considerably, and these variations are accentuated by the various levels of the land. In the N. the cold is severe, but is moderated by the Chinook, a wind blowing from the Rocky Mts. which melts the snow in a few hrs. It is a moisture-bearing wind, and its influence is not entirely beneficial.

The prov. is rich in minerals. Great veins of both bituminous and anthracite coal have been found in A., and it is believed that over 25,000 sq. m. are underlaid with this mineral. Some 85 per cent of the coal resources of Canada are in A., and 25 per cent. of those of all N. and S. America. Coal production in 1937 amounted to about 5½ million tons. Petroleum is found in the Turner Valley in S. Alberta and in other parts in commercial quantities. The sands of the N. Saskatchewan R. have for years yielded some gold; there are large salt deposits in the N., and immense beds of tar sands in the district E. of Athabasca R. The mineral output was valued at about \$6 million in 1936.

Two-thirds of the pop. are engaged in agriculture. It is estimated that there are about 85,000,000 ac. of agric. land in A., of which, in 1938, about 13,410,000 ac. were under field crops. All the usual cereals are produced in large quantities, and alfalfa is also extensively cultivated. There is a large dairying industry. Important irrigation enterprises, which water an area of over 1,000,000 ac., are operating at Calgary, Lethbridge, Bassano, and Medicine Hat. Mixed farming and dairying are features of the central section of the prov. The raising of horses, beef cattle, and hogs is also a feature.

Lumbering is a large industry in N. A. Spruce, pine, poplar, birch, larch, and Douglas fir are the chief timbers. The great lakes of N. A. are stocked with fish, especially whitefish and pike. Trout and pickerel are also abundant. Fur trading is still an important industry, with Edmonton as the centre.

Secondary industries, which mainly supply local needs, comprise abattoirs and meat-packing plants at Calgary and Edmonton. Flour and saw-mills, brick-yards and tile-works, iron-works, harness factories, and stone quarries, are located at many points.

Railway development has been rapid since 1900. The lines of the Canadian Pacific railway run from Medicine Hat and from the E. through the Crow's Nest and Kicking Horse passes over the Rockies. The mts. are also crossed by the Canadian National railways via the Yellowhead Pass. The main line of the C.P.R. runs E. and W. through Calgary, and from there are branches to Edmonton and Macleod, with offshoots starting at

Lacombe and Wetaskiwin. Two through lines of the C.N.R. connect Edmonton with Winnipeg, Port Arthur, and other centres in the E., and with Vancouver and Prince Rupert in the W. Canadian National lines also extend to Calgary from E. and N., and there are also extensions westward into the coal-fields.

A., as other prairie provs., was severely hit by the economic depression of 1930-1932, and for years afterwards the people of the prov. were far from their previous degree of prosperity. This no doubt was partly due to over-cultivation of wheat and the impoverishment of the soil. See further under ABERHART, WILLIAM.

The gov. is vested in a lieutenant-governor, an Executive Council of 8 members, and a Legislative Assembly of 60 members elected for 5 years.

Cap. Edmonton (pop. 86,000), chief towns, Calgary (pop. 83,400), Lethbridge, Medicine Hat, Bassano, Strathcona, Red Deer. See L. Thwaites, *The Province of Alberta*, 1912; A. D. MacRae, *History of Alberta*, 1912; J. Blue, *The Province of Alberta*, 1924; and A. L. Burt, *The Romance of the Prairie Provinces*, 1930.

**Alberti, Leone Battista** (1404-72), It. architect, sculptor, painter, musician, and man of letters, was b. at Venice. He was for some time pontifical secretary at Rome, where some monuments of his skill remain, but his best work is generally held to be the church of San Francesco at Rimini. He also designed the churches of Sant' Andrea, Mantua, and Santa Maria Novella in Florence. He was one of the earliest revivers of classic architecture. He wrote works on the theory of painting and statuary, but his great work is the *De re edificatoria*, printed 1485. See Mancini, *Vita di Leo Battista Alberti*, Florence, 1882.

**Albertinelli, Mariotto** (1474-1515), b. at Florence, It. painter, was the pupil of Cosimo Rosselli, and fellow-students with Fra Bartolommeo, with whom he collaborated in sev. works. Among his famous paintings may be named a 'Visitation' at the Uffizi in Florence, and a 'Virgin and Child' in the Louvre.

**Albertite**, a variety of asphaltic coal found in Albert co., New Brunswick. It is soft, and a shiny jet-black in colour.

**Albertus Magnus** (1193 or perhaps 1206-80), one of the greatest scholastic philosophers of the Middle Ages. He studied science at Padua, entered the Dominican order about 1222, and taught theology at Ratisbon, Strasburg, Cologne, and Paris (1245). His works occupy 21 folios. St. Thomas Aquinas was his great pupil. His erudition was so extraordinary for the time as to comprise a very considerable knowledge of Arabian and Rabbinical literature. In natural science he followed Aristotle and Avicenna, agreeing with the latter over the impossibility of genuine metallic transmutation. See J. Sighart, *Albertus Magnus, sein Leben und seine Wissenschaft*, Ratisbon, 1857.

**Albertville**, cap. of a dist. in the Belgian Congo at the end of the railway from Kabalo (Upper Congo); situated on Lake

**Tanganyika**; connected with the E. coast by the railway Kigoma-Dar-es-Salaam. Important commercial and transshipment centre.

**Albertville**, a tn. in the dept. of Savoie, France, near Chambéry. The tn. is divided by the riv., and has important manufs., especially pottery. Pop. 6500.

**Al-Beruni**, see BERUNI.

**Alberus, Erasmus** (1500-53), a Ger. reformer and man of letters, was b. at Sprendlingen near Frankfort-on-the-Main. He went to Wittenberg in order to study theology, and there met Luther, whose cause he soon espoused. His chief weapon in defence of Lutheranism was literary satire. He also wrote hymns, some of which are still to be found in the Ger. Protestant Hymnal, but his memory is preserved chiefly by his fables.

**Albi** (Lat. *Albige*). Fr. tn., dept. of Tarn, possesses numerous interesting monuments of its varied hist. It is the seat of an archbishopric, and manufs. linen goods. Trade is in wine and aulse. The Albigenes took their name from this tn. Pop. 26,623.

**Albicore**, or **Albacore** (Portuguese *albacor*, from Arabic *al bahr*, the young camel), a large species of tunny. The name is also applied to other species.

**Albigenses**, or **Catharists**, those holding a heresy which appeared in the S. of France in the early part of the eleventh century. Their creed, eastern in its origin, was allied to that of the Paulicians, a Gnostic sect holding Manichaean doctrines. It is difficult to discover exactly what their teaching was, since there are practically no texts of theirs extant. They preserved a continuous and determined opposition to Rome and all Catholic doctrines and practices. In this alone can they be considered as precursors of Protestantism. The A. were zealous, and their doctrines, supported by the nobility of S. France, spread rapidly. They were condemned at various councils, including the Lateran Council of 1179, but these condemnations only increased their opposition. Innocent III. resolved to extirpate the heresy, and in 1198 he sent 2 Cistercian monks, Regnier and Guy, to try pacific measures. These failing, he ordered a crusade to be preached against the A., which was led by Simon de Montfort, and continued until politically ended by the treaty of Paris, 1229. The heretics were almost reduced, and the erection of an Inquisition soon completed the work. The A. are not heard of after the early fourteenth century. See C. Schmidt, *Histoire de la secte des Cathares*, etc.

**Albinism**, that condition of the skin, hair, and eyes in which there is a congenital absence of pigment. Albino is the name given to a person suffering from this defect. A. may be partial, when there are irregularly shaped white patches on the skin or hair, or complete, when the entire surface is unpigmented, including the hair and the choroid coats and irises of the eyes. The irises appear pink because in the absence of pigment the transparency of the iris and retina

allows the blood in the small veins of the eyeball to show through. This transparency of the iris constitutes a disability in sunlight, so that albinos usually pucker up their eyes and are often short-sighted or affected with nyctalopia; at night, however, their sight is better than normal, owing to the greater amount of light reaching the retina. A. occurs in all races of human beings, but particularly among negroes, whose race also shows a partial A. in which the black skin has white patches. It also occurs in nearly all classes of the animal kingdom, particularly among mammals. In some cases the A. is periodic and is restricted to the winter months, so that it enables animals in snow-covered countries either to approach their prey or to escape detection by their enemies; notable examples are the arctic fox and arctic hare. A. is partially hereditary, and occurs periodically in accordance with a regular system, which has been investigated by Mendel and others. The phenomenon also occurs among plants.

**Albinus, Bernhard Siegfried** (1697-1770)—original family name Weiss (Ger., white), of which A. is the Latinised form—great Ger. anatomist. He taught both at Leyden and Paris. He was b. and d. at Frankfort-on-the-Oder.

**Albion**, anct. name of Britain among Gks. and Romans. The name is perhaps of Celtic origin, but the Romans took it as connected with *albus* (white), referring to Dover cliffs.

**Albion**: 1. A city of Calhoun co., Michigan, U.S.A., on the Kalamazoo R. A college of the Methodist Episcopal Church is situated here. It is the centre of a grain dist., with manufs. of agric. implements. Pop. 8300. 2. The co. seat of Orleans co., New York, U.S.A., 30 m. from Rochester; exports apples, cabbages, and beans. Pop. 5600.

**Albion, New**, the name given by Sir Francis Drake to the dist. of Lower California, in N. America, which he visited in 1579. Later geographers, led by Humboldt, restricted the name to the dist. which Drake actually explored, between San Francisco Bay and the Columbia R. Name is no longer used.

**Albion Metal**, a compound formed from a sheet of tin laid on a sheet of lead, the two being combined by pressure between rollers.

**Albistan**, also called **El Bostan**, a tn. of Asiatic Turkey, near Marash. Pop. about 7000.

**Albite**, a silicate of soda and aluminium belonging to the feldspar group.

Its colour is pure white, whence its name (Lat. *albus*), and thus it can be distinguished from true feldspar, with which it often occurs. It forms a constituent of granite, and many crystalline rocks, either of primary or of secondary origin. Sev. varieties of A. are distinguished, e.g. periclino.

**Alboin**, king of the Lombards, succeeded his father about the year A.D. 565. At this time the Lombards dwelt in Noricum and Pannonia. In conjunction with the Avars, A. overcame the

Gepidae, whose king he killed. Rosamund, the daughter of the dead king, he took for his wife. About 563 he invaded Italy, meeting with practically no resistance save at Pavia, which he held out for about 3 years. During the siege he overran a great deal of N. Italy, ruling over the whole of Venetia, Lombardy, Tuscany, and Piedmont. In 573 he was murdered by his wife's paramour, Longinus, who was instigated to the crime by Rosamund, whom the king had insulted by forcing her to drink from the cup formed of her dead father's head. See Paulus, *History of the Lombards* (trans. W. D. Foulke), 1907.

**Albana**, a city of Italy situated on the E. side of Istria, near Pola. In the vicinity are lignite mines. Pop. about 15,000.

**Albani, Marietta** (1823-94), celebrated contralto opera-singer, was b. at Cesena, in the Romagna, and was trained first under Mme. Bertolotti at Bologna, and then under Rossini. Her first appearance, in 1843, at La Scala, Milan, was followed by brilliant successes throughout Europe and the U.S.A. She married first Count Pepoli (d. 1866), and secondly (1877) a Fr. officer, M. Zieker.

**Alborak** (Arabic *al burak*, from *baraka*, to flash, shine), the name given to an imaginary animal of a shining whiteness, on which, according to the Moslem tradition, Mohammed journeyed from the temple of Jerusalem to heaven.

**Albornoz, Gil Alvarez Carillo** (1310-1367), cardinal, b. at Cuencu, created archbishop of Toledo in 1337 by Alfonso XI. He fought against the Moors, but later went to Pope Clement VI. at Avignon, some say in flight from Pedro the Cruel. In 1350 this pope made him a cardinal, and in 1353 Innocent VI. sent him as legate into Italy to negotiate the restoration of the Church's temporal power. This he did, with the help of Rienzi.

**Albox**, a tn. of Spain in the prov. of Almeria. The tn. is noted for its biennial fairs. Pop. 10,000.

**Albrecht**, shortened from Adelbrecht, Old High Ger. Adalpraht.

**Albrechtsberger, Johann Georg** (1736-1809), Austrian composer, theorist, and teacher, b. at Klosterneuburg, near Vienna. Among his pupils was Beethoven, to whom he gave lessons in counterpoint.

**Albret** (*Lebret* or *Labrit*), an anct. lordship of France, of which the fame centres on the Château d'A., the castle of one of the most powerful medieval families of France. During the fourteenth-century wars many of its members espoused the Eng. cause. Henry IV., king of France, was the son of Jeanne d'A., queen of Navarre, who had married Anthony de Bourbon, duke of Vendôme.

**Albright** (*Albrecht*), **Jacob** (1759-1868), Amer. clergyman, b. near Pottstown, Pennsylvania. Converted to Methodism in 1790, he preached that faith among the Pennsylvania Gers. Latter-day adherents of the church he founded are known variously as 'New Methodists' and 'Albrights.'

**Albrizzi, Isabel Theotoki, Countess of** (1770-1836), b. at Corfu, d. at Venice. She was witty, and the keenness of her intellect brought her in contact with the renowned literary men of her day. Byron, whom she met at Venice, called her the Mme. de Staël of Venice. She is chiefly remembered by *Ritratti*, a series of portraits of famous It. contemporaries and criticisms of plastic art.

**Albuera**, Sp. vil. in prov. of Badajoz, 13 m. S.E. of tn. of Badajoz. Famous for the defeat of the Fr. under Marshal Soult by the Brit. and Portuguese, 1811. Pop. 800.

**Albufera** (Arabic, the water) is a lake in Valencia, Spain, separated from the sea by a narrow tongue of land, but with which it is connected by canal. It abounds in wild fowl and fish, and its revenues were given to the Duke of Wellington. The Eng. were defeated by Suchet near Albufera, 1812.

**Albufera, Duc d'**, see SUCHET, LOUIS GABRIEL.

**Albula Pass**, in the Grisons (Switzerland), connects the valleys of the Rhine and Inn. A railroad was completed across it in 1903, making the shortest route into the Upper Engadine. Highest point 7,590 ft.

**Album** (Lat. *albus*, white), a board (exposed in some public place such as the Forum), plastered or painted white, on which, in anct. Rome, were inscribed the public edicts and announcements. The name was extended to include the *Annales* of the pontifex maximus, the list of decurions, of jurors, etc. In modern times the name is applied to a notebook in which verses, sketches, autographs may be collected, or the larger books in which photographs are kept. In the Middle Ages any register or catalogue of saints, civil functionaries, etc., was called an A. On the Continent the term is now applied to the list of members of a univ.

**Albumazar** (*Abu-Maashar*), an Arab writer on astronomy or natural astrology, was b. at Balkh c. A.D. 805. His most famous work is entitled *De Magnis Conjunctionibus*. He also wrote *Introductionem in Astronomiam* and *Flores Astrologiae*. He held that the creation of the world took place when the 7 planets were in conjunction in the first degree of Aries, and that the end of the world will come with a similar conjunction in the last degree of Pisces.

**Albumen**, in plants, is a white substance which contains food material for the embryo, and is found in the seed. It is not a similar substance to the A. of an egg; the name was applied only by analogy, and a common name for it is *endosperm*. Plants are said to be *albuminous* (e.g. ash) or *cralbuminous* (e.g. pea).

**Albumin**, a term applied to a group of organic bodies of very complex structure. The chemical investigation and classification of these compounds is a matter of great difficulty, but there are certain important properties which are characteristic of the group generally. They

contain 5 elements, the proportions of which do not greatly vary in the different members of the group: Carboq., from 50 to 55 per cent; hydrogen, from 6.5 to 7.3 per cent; nitrogen, from 15 to 17.6 per cent; oxygen from 19 to 24 per cent; sulphur, from 0.3 to 5 per cent.

As. are colloidal substances, that is, they do not pass through parchment paper, and advantage is taken of this property to separate them from salts in solution. The addition of alcohol to the aqueous solution precipitates the A., and boiling with water produces coagulation. Different As. coagulate at different temps., and after coagulation all As. are insoluble in water and can only be made to dissolve by being treated with caustic alkalis or mineral acids.

The As. proper and the allied compounds are of great importance physiologically. With the exception of fats and mineral salts, all the dry material of animal bodies is made up of albuminous substances, or proteins, as they are sometimes called, according to the classification adopted. They are an essential part of every plant cell, and they form an indispensable constituent of human and animal food. The body can exist for a long time without fats or carbohydrates, but death is inevitable on the withdrawal of proteins from its nourishment. The chief proteins found in food-substances are egg-A. in white of egg, fibrinogen and hæmoglobin in blood, myosin in meat, caseinogen in milk, casein in cheese, and gluten in flour. In the process of digestion, proteins are split up into peptones, and these again into amino-acids. The products of digestion go mainly to the blood-stream for the building up or repair of the tissues.

Egg-A., or white of egg, is used as an antidote to poisoning by corrosive sublimate, sugar of lead, and copper sulphate, as it forms insoluble compounds with those substances. It is also used in the refining of sugar and for fixing light shades in the colour printing of textiles.

**Albuminoids**, a term of doubtful application. It is sometimes used as a generic term to denote those substances which resemble egg-albumin, such as myosin, casein, globulin, fibrin, and gluten. In anatomy, the term has another use, denoting the substances composing the connective tissues, as collagen, keratin, fibroin, elastin, etc.

**Albuminuria**, the presence of albumin in the urine. The immediate cause is the escape of the blood albumins from the blood-vessels into the renal tubules. There may be definite lesions of the kidney, or the condition may be due to a variety of causes. Accidental or spurious A. is due to the presence of blood or pus from hæmorrhage, or disease of the ureters, bladder, or urethra. Febrile A. is a condition accompanying many fevers and rarely lasts longer than the fever. Cyclic A. derives its name from the periodic appearance and absence of albumin in the urine. The albuminuric paroxysms are generally absent at night, and appear to be the result of the

assumption of the upright posture. A. is most common in growing youths of poor nutrition and anæmic tendency, may submit to careful treatment, but on the other hand may lead to degeneration of kidney structure many years later; hence the importance of an albumin test in connection with life-assurance risks. The simplest test is coagulation of the albumin. The urine is filtered to remove any turbidity, and if alkaline or neutral in reaction, a small quantity of acetic acid is added. A test-tube is filled about two-thirds full and the upper part of the column of urine carefully heated. Any turbidity that appears can be at once detected by comparison with the lower part of the column, and may be due to albumin or phosphates. If it is due to albumin, adding nitric acid will increase the turbidity; if to phosphates, the liquid will be cleared at once.

**Albumosuria**, a medical term used to denote a species of disease characterised by the presence of albuminous matter in the urine. It is often a symptom of bone disease, and is detected by the addition of nitric acid in the urine, which produces a milky turbidity, while in cases of the less serious disease, albuminuria, it produces opaline effluvia.

**Albuñol**, tn. in S. Spain, prov. of Granada, 40 m. S. of city of that name, near the coast of the Mediterranean, on which it has a port. It stands in a vine-growing dist., and exports almonds and wine. Pop. 2,800.

**Albuquerque**: (1) City of Spain, prov. of Badajoz, 9 m. from the Portuguese frontier. It has cotton and woollen manufs., and was once strongly fortified. Pop. 10,300. (2) Co. seat of Bernalillo co., New Mexico, U.S.A., on the Rio Grande, and at the junction of the Atchison, Topeka & Santa Fé and Pacific railroads. Gold, silver, and iron mines in vicinity. There are sev. important buildings and a brisk trade in wool and hides. Pop. 35,500.

**Albuquerque, Alfonso d'**, surnamed the Great (1453-1515), founder of the Portuguese power in the E., was b. near Lisbon and spent his youth at the court of Alfonso V. Being made viceroy of the Portuguese Indies, he took Goa, 1510, and then in rapid succession Malabar, Ceylon, Malacca, 1511, and later Ormuz, 1515. His rule was wise, firm, and humane. In 1515 Emmanuel recalled him, putting his personal enemy, Lopes Soares, in his place. He d. at Goa. See *Commentarios do Grande Afonso Dalboquerque* (Lisbon, 1557), written by his son; translation pub. by Hakluyt Society (1875-84).

**Alburnum**, or sapwood, is the wood lying immediately below the bark, in opposition to the duramen or heartwood in the central region. The duramen is the old wood which has grown harder, and incidentally darker, and has lost its functional activity; the A. is the new wood. Whitewood trees consist wholly of A., and are consequently fit only for temporary purposes.

**Albury**, tn. in New S. Wales, Australia

at the head of the navigation of the Murray R., from the mouth of which it is 1800 m. distant. It is 386 m. S.W. of Sydney by rail. A. is the centre of an important vine-growing dist. Pop. 12,000.

**Alcaeus** (c. 600 B.C.), contemporary of Sappho, was one of the first lyric poets of Greece. Of aristocratic birth, he was yet a fiery democrat, and vigorously opposed both the tyrant Myrsilus and the popular ruler Pittacus. He wrote odes in the Æolic dialect, using the measure which bears his name. Fragments to be found in Bergk's *Poeta Lyrici Græci*. Alcaics are of 2 kinds, the greater and the lesser. The greater alcaic is an 11-syllabled line of 5 ft., viz. either a spondee or an iambic, an iambic, an extra long syllable and 2 dactyls. The lesser has 4 feet, viz. 2 dactyls and 2 trocheics. The alcaic ode is composed of sev. strophes, each of 4 verses; the first 2 are always alcaics of the first kind, the third is an iambic of 4 feet and a long syllable, and the fourth verse is an alcaic of the second kind. This ode was much used by Horace.

**Alcahest**, or **Alkahest**, a term introduced into alchemy by Paracelsus to denote the unknown 'quintessence' of creation, the one real elementary form of matter. He considered this to be the universal solvent that the alchemists sought.

**Alcaide**, or **Alcayde** (Arabic *al kayd*, the head or leader), a Sp. word formerly used to denote the governor of a fortress or a castle, a gaoler or a warden.

**Alcala de Guadaira**, tn. of Spain, prov. of Seville, 7 m. E. of tn. of that name, supplies Seville with bread. Pop. 16,800.

**Alcalá de Henares**, anct. tn. of Spain, prov. of Madrid, on R. Henares, 17 m. E.N.E. of Madrid. Its famous univ., founded by Cardinal Ximenes in 1510, was removed to Madrid in 1836. It is the bp. of Cervantes. Pop. 10,600.

**Alcalá la Real**, city of Spain, prov. of Jaén (Andalusia), about 3000 ft. above the sea on N. side of the Granada Mts. In 1810 the Fr., under Count Sebastiani, defeated the Spaniards here. Pop. 21,400.

**Alcalde** (Sp., from Arabic *al cad*, the judge), general title for a judicial officer in Spain and parts of America settled by the Spaniards.

**Alcámenes**, a famous Athenian sculptor of the end of the fifth century B.C., possibly a pupil of Phidias. His best-known works are a 'Hephaestus' and an 'Aphrodite of the Gardens'.

**Alcamo**, tn. on Is. of Sicily, prov. of Trapani, at the foot of Mt. Bonifacio. Its buildings were erected chiefly by the Saracens, who possessed it until 1233. It has mineral springs. Pop. 52,000.

**Alcamo, Ciula d'**, see CIELO DALCAMO. **Alcañiz**, city of Spain, prov. of Teruel, Aragón, on R. Guadalupe, 60 m. S.E. of Saragossa, has fine anct. buildings and important alum works. A. was captured by the insurgents, in the Civil war, in Mar. 1938. Pop. 7500.

**Alcántara** (Arabic, the bridge) receives its name from the magnificent bridge

built by the Emperor Trajan in the early second century. The bridge, surmounted by a triumphal arch, is over 600 ft. long and 200 ft. high, and is composed of 6 arches. It was partially destroyed in the Peninsular war, but was lately reconstructed. Pop. 3600.

**Alcantara, Dom Pedro De**, see PEDRO I. and II.

**Alcántara, Knights of**, founded as the order of St. Julian, formed a military and monastic order for the defence of Spain against the Moors. The order was founded in 1156 and approved by Pope Alexander III. in 1177. In 1835 it was changed from an eccles. to a court order.

**Alcaraz**, tn. of Spain, prov. of Albacete, on slope of mts. of Albacete and 34 m. W.S.W. of tn. of that name. Above it is a ruined castle, and there are remains of a Rom. aqueduct. Important copper and zinc mines are to be found in the vicinity. Pop. 5300.

**Alcarria, La**, a productive dist. in the prov. of Guadalajara, Spain. The market centre for the grain and fruit of this dist. is the tn. of Brihuega.

**Alcaudete**, a Sp. tn. in the prov. of Jaén, Andalusia. Pop. 15,200.

**Alcázar**, the name of sev. palaces of the Moors in Spain, the most important of which are: the two As. of Cordova—the 'A. viejo' built by the Arabs, and the 'A. nuevo' built by Alphonso XI. The A. of Segovia contained many art treasures, statues, and historical relics. It was, however, destroyed by fire in 1862. The A. of Seville was built by the Arabs in the twelfth century, and has been enlarged sev. times, presenting a mixture of oriental and Gothic architecture. It contains many valuable curios. Toledo, had 5 As., of which the most beautiful was destroyed by fire in 1710, and that of Alfonso VIII. has been converted into a monastery.

**Alcázar**, a Sp. tn. in the prov. of Ciudad Real, New Castile. It is generally believed that this is Alce, the scene of the victory of Tiberius Sempronius Gracchus in 180 B.C. Pop. 14,700.

**Alcázar-kebir**, city of Morocco, an important caravan centre. Here, in 1578, Sebastian of Portugal was defeated and slain by the Moors. Pop. 35,000.

**Alcedo**, a genus of kingfishers which belongs to the family Alcedinidae, and is allied to the hoopoes and hornbills. *A. ispida* is the European species of kingfisher.

**Alcester, Frederick Beauchamp Paget Seymour**, first Baron (1821-95), an Eng. admiral, b. in London. Began his naval career in 1834, and commanded the *Alcester* in the Crimean war. He was commander-in-chief in the Mediterranean from 1880 to 1883, and directed the bombardment of Alexandria in 1882. For this and other services during the war he was created baron in 1882.

**Alcestis**, the subject of the tragedy of Euripides, was the daughter of Pelias and Anaxibia, and wife of Admetus, who won her by Apollo's aid. When the time came for her husband to die, she consented to give her life for him and

was eventually brought back from the lower world.

Alchemy, usually associated with the magic arts and with astrology, but in reality the beginning of our systematic chem. The origin of the word is variously given, being derived from the Gk. and from the ancient Egyptian, via Arabic. The art probably had its origin in Egypt, since Egypt possessed a civilisation and culture far in advance of those of any contemporary nation. It is therefore not surprising to learn that the earliest mention of A. is to be found in the records of the Egyptians. Legend after legend grew up and was perpetuated in some way or another by writings regarding the origin of this very mystical science. The origin is variously attributed to Hermes Trismegistus ('the thrice greatest'), to the fallen angels of the Book of Genesis (vi.), and yet again by revelation to Moses and Aaron. The origin through Hermes is the one which was most generally accepted, and also the one which has affected chemical language down to the present day (cf. 'hermetically sealed'). He was the Egyptian ideal of personified strength, the great god Thoth, and his divine art of A. was a secret revealed only to a sacred school of the sons of kings. Astrology and magic were the accompanying sciences of A., and that whole science was based upon the transmutation of metals, which seems from the researches of Berthelot, in his study of the third century A.D. Leyden papyrus (found in Thebes in the nineteenth century), to have undoubtedly originated in Egypt. During the fourth and fifth centuries the writings of the alchemists continued increasing until by the end of the fifth century we may say that speculative A. had reached its highest point in the Alexandrian schools. The results of the appearance of the Muslims in the civilised world did not at first promise to further the arts and sciences, but within a short time of their appearance the Muslim schools began to become famous, and the names of many Arabs and Persians are among the most notable of the alchemists. The most famous of these Muslim alchemists was Jabir ibn Hayyan, known to the west of Europe as Geber. His name is bound up with the chemical knowledge of the time, but much that has been attributed to him has been found to be spurious, and many of his so-called writings are writings of a much later date. His own ideas were very similar to those of the old Alexandrian philosophers, and he believed even in the influence of the planets on metals.

The theory of transmutation, although modified to a certain extent by the later alchemists, can be traced quite easily in the writings of the Gk. philosophers. All substances were ultimately composed of one elemental matter, and so the alchemist hoped to be able by the removal of all the foreign matter to obtain the *materia prima*. This theory of A. still existed amongst the alchemists of the Middle Ages; that they believed in it as

firmly as did the ancients cannot perhaps be definitely stated. Men such as Albertus Magnus, Roger Bacon, Arnold of Villeneuve (q.v.), and Vincent of Beauvais all held these beliefs. Roger Bacon, to quote only one example of this period, believed in the philosopher's stone, which was to turn the baser metals into gold, and also in the elixir of life. When it is remembered that numerous ideas of Roger Bacon were far beyond his time, it will be seen that the alchemistic ideas had a very strong hold indeed. To come down to almost modern times, certainly well into the seventeenth century, these alchemistic ideas were still held, at any rate from the academic point of view, by the chemists of the period. Among them may be mentioned Glauber (1603-1668), Robert Boyle (1627-91), and for some time Newton and Leibnitz, and even Dr. Johnson, who was interested in chem. The science has been adhered to by some right down to the present century, and recent alleged successful transmutations have been reported from Armenia and France. With the twentieth century and the research into radio-activity, artificial transmutation of certain elements has been accomplished on a small scale. The views of the alchemist certainly do not receive support here, but the essential principle underlying all the experiments of A. seems to have received some little encouragement. See also TRANSMUTATION OF THE ELEMENTS; ALBERTUS MAGNUS. See A. E. Waite, *Lives of the Alchemists*, 1888; M. Berthelot, *La Chimie au moyen âge*, 1893; E. O. von Lippmann, *Die Entstehung und Ausbreitung der Alchemie*, 1919; E. J. Holmyard, *Makers of Chemistry*, 1931; J. Read, *Prelude to Chemistry*, 1936, and *The Alchemist in Life, Literature, and Art*, 1948; K. K. Doberer, *The Goldmakers*, 1948.

Alciati, Andrea (1492-1550), It. jurist and poet, b. at Milan, d. at Pavia. He was prof. of civil law at Avignon, Pavia, and Ferrara. His refined legal criticisms make him founder of the 'elegant' school of law. He made commentaries on the Pandects and on the Justinian code. His criticisms of Rom. law were of a revolutionary nature. His book of moral sayings in Latin verse called *Emblems* (*Emblematum Libellus*) is famous.

Alcibiades (450-404 B.C.) was b. at Athens and was connected through his mother with the house of the Alcmaeonidae. He was left an orphan at a very early age, and this lack of proper control during his youth probably accounts for some of his later excesses. Socrates, who saved his life at Potidaea, and whose life he saved at Delium, obtained some influence over him and tried to eradicate his vices, but with very little effect. After the battle of Delium, 424 B.C., he married Hipparete, and at this time he began to turn his attention to public affairs. He wished to ally himself with the Spartans, but on their choosing his rival Nicias to negotiate for them in 421 B.C. he immediately became their enemy.



Instead of taking part in the Sicilian expedition of 415, he again joined them, escaping to their country because he was accused of the mutilation of the images of Mercury. He now became the enemy of the Athenians; but he soon forsook the cause of the Spartans and tried to get the Athenians to recall him, promising them an alliance with Tissaphernes, the Persian satrap. This plan was not successful, but he was eventually recalled to Athens by Thrasybulus. In 407 B.C., on his return to that city, he was completely restored to his former position, but had his command taken from him the next year. He then chose exile as his only means of safety, and in 404 B.C. he went to take refuge with Pharnabazus, wishing to go thence to the court of Artaxerxes. He was prevented from doing so, however, for while there his residence was set on fire. In trying to escape the flames he rushed from the house to fall pierced by the arrows shot by emissaries of the Spartans. See Thucydides, *Histoire d'Alcibiade* (Paris, 1873) by H. Houssaye, and Plutarch's *Lives*.

**Alcidæ**, the auks, belonging to the Charadriiformes, and are allied to sea-gulls. They have webbed feet and fly well. They live on rocks, lay a single egg, and feed on fish. *Alca impennis*, the great auk, now extinct, had short, useless wings; *A. torda* is the razorbill; *Fratercula arctica* is the puffin.

**Alcides**, see HERCULES.

**Alcinous**, in Gk. mythology a king of the Phæaciens, in the is. of Scheria, son of Nausithous and grandson of Neptune. He is celebrated in the *Odyssey*, the narrative of his reception and entertainment of Ulysses, who as an outcast on the shore of the is. was relieved by A.'s daughter, Nausica, being the main theme of bks. vi to xii of that poem. See also AUGONAUTS.

**Alciphron** lived probably during the second century A.D., though there is great doubt as to his exact century. He was a Gk. writer, and is noted especially for a collection of fictitious letters voicing the opinions of various classes of people on familiar subjects. The scene is laid in Athens, and the letters are written in the purest Attic dialect.

**Alcira**, a Sp. tn. in the prov. of Valencia. A., which consists of the tn. proper and 2 suburbs, was built by the Carthaginians, and in medieval times belonged to the Moors. It is believed to have been the Rom. tn. of Satabicula, and was originally a strong fortification, being very thickly walled. Its staple products are silk and fruit. Pop. 23,000.

**Alcylde**, see STRATHCLYDE.

**Alcmon**, son of Amphiaræus and Eriphyle, and brother of Amphilocheus. He took part in the expedition of the Epigoni against Thebes—in which also Amphiaræus participated at the cost of his life, having been induced to do so by Eriphyle against his premonition of misfortune. To avenge his life Amphiaræus enjoined his sons to kill their mother. A. did so on his return home and was pursued by

the Furies in consequence. He was first cured of his madness by the king of Psophis, whose daughter Arsinoë he married, and of his second fit of madness by the riv.-god Archelous, whose daughter Callirrhoe he also married. His treachery was discovered by Arsinoë's father, whose sons murdered him.

**Alcmæonidæ**, a noble family at Athens, who were driven out of Pylus in Messenia by the Dorians, and settled at Athens. Owing to the way in which Megacles, one of the family, treated the insurgents under Cylon (612 B.C.), they brought upon themselves the guilt of sacrilege and were exiled from Athens, c. 595. About 560 they returned, but were again expelled by Pisistratus. In 548 they agreed with the Amphictyonic council to rebuild the temple of Delphi, and won great popularity throughout Greece by executing the work in a style of grandeur much exceeding their obligations under the agreement. On the expulsion of Hippias in 510 they were again restored to Athens. They now joined the popular party, and Cleisthenes, who was then the head of the family, gave a new constitution to Athens.

**Alcman**, b. at Sardis during the seventh century B.C., was a lyrical poet of Gk. extraction. He settled in Sparta, where, among other kinds of poetry, he wrote in the Doric dialect parthenic choruses sung by the young girls of Sparta. He is said by some to have been the first writer of love poetry. The fragments of his poems which are extant are to be found in Berk's *Poetæ Lyrici Græci*, Leipzig, 1843.

**Alcobaca**, a tn. in Estremadura, near Lisbon, Portugal, at the conjunction of the Alcoa and the Baça. Its chief historic interest is a superb Cistercian monastery founded in 1143 by Don Alfonso. The old Gothic church holds the tombs of Alfonso I. and II. Sancho I., Pedro I. (q.v.), and his ill-starred mistress Inês do Castro. The library is extensive. Pop. 2400.

**Alcock, John** (c. 1130-1500), was an Eng. ecclesiastic. He was the founder of Jesus College, Cambridge.

**Alcock, Sir John William** (1892-1919). A distinguished Brit. airman who, with Sir Whitten Brown, made the first trans-Atlantic flight (see ATLANTIC FLIGHTS); but subsequently lost his life on a flight to France.

**Alcoforado, Marianna** (1640-1723), a nun of Beja in Portugal, and the author of the famous *Lettres portugaises*, 1669, a series of passionate love-letters written in 1625-27 to the young Noël Bouton, afterwards marquis de Chamilly and marshal of France.

**Alcofrabas Nasier**, the pseudonym used by Rabelais when he pub. *Pantagruel*. The name is an anagram of his own name, François Rabelais.

**Alcohol**, a term applied to a group of organic substances which may be regarded as derived from the hydrocarbons by the substitution of one or more univalent hydroxyl groups OH for the same number of atoms of hydrogen. The name A. is, however, usually applied to

one member of that group, ethyl A., which is present in varying quantities in wine, beer, spirits, etc.

The aliphatic A. series contains methyl, ethyl, propyl, butyl, amyl, hexyl As., etc., and their isomerides. The lower As., from methyl A. to butyl A., are mobile liquids, the middle As. are oily liquids, and the upper As. are waxy solids. The lower As. have a characteristic spirituous smell which becomes disagreeable higher up in the series. The most important members are methyl A. and ethyl A.

*Methyl A.* or *methanol* ( $\text{CH}_3\text{OH}$ ) is produced in the dry distillation of wood. The aqueous product of the distillation contains about 1 to 2 per cent of methyl A., which can be separated by fractional distillation after the removal of the acetic acid by hot milk of lime. Methyl A. is used in the preparation of aniline dyes and for the denaturation of ethyl A. It is now prepared synthetically, on a large scale, from carbon monoxide and hydrogen, which are made to react under pressure, at  $450^\circ\text{C}$ ., in the presence of metallic oxides; the latter act as catalysts.

*Ethyl A.* or *ethanol* ( $\text{C}_2\text{H}_5\text{OH}$ ) has been known from the earliest times as produced in the fermentation of grape juice. When pure it is a mobile colourless liquid with a characteristic odour. It solidifies at about  $-130^\circ\text{C}$ ., hence its use in thermometers intended to register low temperatures. It is miscible with water in all proportions, and burns with a pale blue non-luminous flame. In the laboratory it may be prepared by converting ethane into ethyl chloride and heating the latter with dilute alkalis under pressure. A. is always prepared for commercial purposes by making use of the process of fermentation (*q.v.*). Dextrose, or grape-sugar, decomposes in the presence of yeast-cells into A. and carbon dioxide, and the dextrose is obtained by making a pulp of any starchy material, such as potato, grain, rice, etc. By enzymes (*see* FERMENTATION) the starch is almost completely turned into maltose, which by combining with water is converted into dextrose. The weak solution of A. thus obtained is subjected to fractional distillation. The distillate or 'raw spirit' contains 'fusel oil,' which is contained in the higher boiling-point fractions. To eliminate the fusel oil, the raw spirit is diluted with water and filtered through charcoal, which absorbs some of the fusel oil. The filtrate is again distilled and collected in 3 fractions, that of the lowest boiling-point being fairly pure A. For most purposes it is unnecessary to get rid of the fusel oil; even beer and whisky contain a small quantity of this substance, which is supposed by some to improve the flavour; it is, however, undoubtedly injurious to health.

In the Brit. Isles a heavy excise duty is levied on 'spirits of wine,' but the Gov. allows certain exceptions in order not to hamper the various industries in which A. is used. Methylated spirit contains 10 per cent of partially purified

wood-spirit and a small proportion of paraffin oil, which render it undrinkable. It is also coloured with an aniline dye. This spirit is sold duty free, and in cases where the paraffin oil would militate against certain manufacturing processes, the spirit may be supplied to manufacturers denaturated with wood-spirit only. For laboratory purposes in univs. and colleges the sale of pure A. is allowed free of duty. Ethyl A. completely free from water and other impurities is known in chem. as 'absolute' A.

The great solvent powers of A. have made it of much importance in the preparation of lacquers, varnishes, and dyes. It is used also for the manuf. of chloroform, chloral, and iodoform, and as a fuel. Its solvent power also makes it valuable in the chemical laboratory, and it is used too for the preservation of anatomical specimens.

The most important fact in connection with A. is the part it plays in the preparation of alcoholic liquors. A vast mass of legislation and of administrative detail, great industries like brewing and distilling, and social and hygienic problems are all cognate to this subject. *See* BREWING, DISTILLING, DRUNKENNESS, EXCISE, LICENCE.

Alcoholic liquors may be divided into 2 classes: those which are distilled and therefore contain a large proportion of A., and those which are the result of fermentation without distillation, and therefore depend for their flavour mainly on the medium in which the fermentation takes place. Of the distilled liquors the chief are brandy, distilled from wine; whisky, from a fermented solution of malt; rum, from a fermented solution of sugar; and gin, from a fermented solution of malt, but flavoured with juniper. Those not distilled comprise beer, which is fermented malt solution flavoured with hops, and wine, which is fermented grape juice. Beer, with its modifications, stout, porter, and the various kinds of ales, usually contains from 3 to 7 per cent of A., and wines from 8 to 17 per cent. Port, sherry, and Madeira are what are called fortified wines, that is, they contain added A. besides that engendered by the fermentation.

The physiological effects of A. are well known. It is a powerful stimulant, increasing the flow of gastric juices when diluted, and in more concentrated doses producing a stronger and more rapid heart-beat. The possible effects of its continual use are catarrh of the stomach, affections of the liver and kidneys, degeneration of the brain, and delirium tremens. Notwithstanding its therapeutic value, medical men are increasingly unwilling to advocate its use, owing to the bad physical effects and the worse moral degeneration consequent upon the A. habit which might possibly be established.

**Alcoholism**, the condition of the body brought about by over-indulgence in alcohol. It includes a morbid state of the liver, kidneys, stomach, etc., but is particularly associated with a condition

of the nerves which gives rise to a persistent craving for alcohol. The desire for drink passes after a time into a physical condition in which the body demands its accustomed allowance of alcohol, and acute nerve troubles are generally the result of its being withheld. Such a condition, however, is merely temporary, and the body gradually accommodates itself to new circumstances. For diseases associated with the condition of A., see DELIRIUM TREMENS, INSANITY, EPILEPSY, and NEURITIS. The general aspects of excessive drinking will be found in DRUNKENNESS.

**Alcoholometry**, the determination of the proportion of alcohol in a liquid. If the liquid is known to contain only alcohol and water, its sp. gr. as shown by a hydrometer would enable the relative proportions of water and alcohol to be known. In hydrometers used for this purpose the graduations are often marked in percentage of alcohol instead of sp. gr. In Sikes's hydrometer the graduations are arbitrary figures, from which the corresponding percentage of proof spirit may be found by the use of a book of tables issued under the authority of the Commissioners of H.M. Customs and Excise. Atkin's hydrometer is provided with a series of scales which enables the strength of any 'wort,' or beer in the making, to be determined.

**Alcoran**, see KORAN.

**Alcott, Amos Bronson** (1799-1888), an American philosopher, b. in New Haven co., Connecticut. He opened in 1831 a small school in Boston which has been vividly described in *Recollections of a School*, a book written by Miss Peabody. His methods of education did not find favour at Boston, and finally he went to Concord, where he occasionally lectured to schools on philosophical subjects. He was the friend of Emerson, Thoreau, Hawthorne, and Carlyle. His theory was neo-Platonic. He was made dean of the Concord School of Philosophy in 1879. Of his writings the best known are: *Concord Days* (1872) and *Table Talk* (1877).

**Alcott, Louisa May** (1832-88), author, b. in Pennsylvania, the daughter of Amos Bronson A., *supra*. Her prin. works are stories written for girls, among these being *Little Women*, 1868, with a sequel, *Good Wives*, and *Little Men*, 1871. Before this, however, she wrote *Hospital Sketches*, 1863, letters describing her work in the hospital during the civil war of 1862-63; also *Aunt Jo's Scrap-book*, 1871-1879; *Jo's Boys and how they turned out*, 1886. See Ednah D. Cheney's *Louisa May Alcott*, 1889, and Lives by B. Moses, 1909; C. Meigs, 1935; and J. B. Wagoner, 1943.

**Alcoy**, a Sp. tn. in the prov. of Alicante. It has a picturesque situation, and is noted for its manufs. It is especially famous for its manuf. of paper, particularly that used for cigarettes; but there are also cotton, linen, and woollen factories. Pop. 34,000.

**Alcuin** (735-804), a celebrated A.-S. scholar. He was b. at York, and edu-

cated at the cathedral school there, apparently under the direction of the great scholar Elbert, whom he succeeded in the headship of the school. With Elbert he seems also to have made a journey to Rome. At Parma about the year 780 he met the Emperor Charles the Great, who gave him rich abbey and persuaded him to settle down at his court. This was part of Charles's plan for the civilisation and education of his Franks. He desired also his help in the creation of schools, and round A. grew up a school at the royal court composed of the young princes and nobles of the palace and sometimes even the great Charles himself. During the period of his greatness he seems to have visited England, to which he was passionately attached, but its stress and strife made it no place for the great scholar, and after 796 he settled down in the abbey of St. Martin at Tours. His works are not famous for their depth, but his letters to his various friends form perhaps the best reflection of the life and manners of his times that we have. A number of his letters are still in existence; his 2 chief correspondents were Arno of Salzburg and the emperor himself. Of his other works we have also quite a number, including a grammar and a number of Lat. verses. His life of Saint Willibrord, to whom he was related, is one of a number of the lives of saints written by him. See *Beati Flacci Albini seu Alcuini Opera*, Ratisbon, 1771; C. Werner, *Alcuin und sein Jahrhundert*, 1876; A. F. West, *Alcuin and the Rise of the Christian Schools*, 1893; G. F. Browne, *Alcuin of York*, 1904; E. M. W. Buxton, *Alcuin*, 1922; W. H. Howell (trans.), *The Rhetoric of Alcuin and Charlemagne*, 1941.

**Aleyone**, or **Halcyone**, was the daughter of Aeolus and wife of Ceyx. One legend says that she and her husband were changed into birds for calling themselves Zeus and Hera, and another that they were both changed into kingfishers after Ceyx was shipwrecked and A. had thrown herself into the sea in grief. 'Halcyon days' were supposed to be days of calm while the kingfisher (alecyon) was breeding in a floating nest.

**Aleyonacea**, a sub-order of Aleyonaria, an order of marine animals. They consist of a firm cartilaginous mass, throughout which calcareous spicules are dispersed. The surface is studded with hydra-like polyps, with tentacles. They are found attached to rocks and seaweed. *Aleyonium digitatum* is popularly called dead men's fingers; *A. gelatinosum* is phosphorescent and inhabits deep water.

**Aldan**, a navigable riv. of Siberia, and affluent of the Lena. It travels over a course of 1300 miles.

**Aldbrough**, a vill. in the W. Riding of Yorkshire, on the R. Ure. Remains of the anct. Rom. tn. of Isurium have been found in the neighbourhood.

**Aldebaran** is the Arabic name of a first-magnitude star ( $\alpha$ ) in the constellation Taurus, its exact magnitude being 1.1. It is of a light-red colour, and is one of the group of 5 called the Hyades.

It is sometimes called the Bull's Eye. The Romans knew it by the name of *Pallicium*, because it set for the last time visibly when the feast of Pales was being celebrated on April 21.

**Aldeburgh**, a tn. in Suffolk. It used to send members to Parliament, but in 1832 this privilege was taken away. Its church, containing a statue of Crabbe the poet, who was born there, and its moot hall are worthy of note. A. also has the distinction of being the first tn. in England to elect a woman to the office of mayor, this honour being conferred on Mrs. Garrett-Anderson in 1908. Pop. 2500.

**Aldegonde**, Philip van Marnix de St., see ST. ALIEGONDE.

**Aldehyde**, the name applied to a group of organic compounds prepared by oxidation of primary alcohols. The term is derived from alcohol *dehydrogenatum*—that is, dehydrogenated alcohol. When oxidised, the As. give fatty acids; formaldehyde produces formic acid, acetaldehyde produces acetic acid, propaldehyde produces propionic acid, and so on. Therefore the As. may be looked upon as intermediary between the alcohols and the fatty acids.

The lower members of the group are colourless, mobile, neutral volatile liquids, usually with an irritating smell. The higher members are odourless solids.

The As. may be prepared by oxidising the primary alcohols, or from the fatty acids by dry distillation of their calcium salts with sodium formate. All the lower As. form crystalline addition products when shaken with a concentrated aqueous solution of sodium hydrogen sulphite. In contact with an aqueous solution of hydrocyanic acid, *cyanohydrins* are formed, which may be converted into hydroxy-acids.

The chief members of the group are formaldehyde and acetaldehyde. *Formaldehyde* ( $\text{H}\cdot\text{CHO}$ ) is prepared by the oxidation of methyl alcohol. It is a product of the incomplete combustion of wood, peat, etc., and traces of it are found in the atmosphere. It is a gas at ordinary temps., but can be condensed to a colourless liquid and even to a white solid. Formalin is a 50 per cent. aqueous solution of formaldehyde; it is used as a disinfectant and for the preservation of anatomical specimens. *Formaldehyde* is also important as the source of bakelite and galalith, two useful substitutes for bone and ivory. The former is made from formaldehyde and phenol ('carbolic acid') and the latter from formaldehyde and casein of milk. *Acetaldehyde* ( $\text{CH}_3\cdot\text{CHO}$ ) is formed by the oxidation of ethyl alcohol. Commercially, acetaldehyde is obtained by causing acetylene ( $\text{C}_2\text{H}_2$ ) to combine with water ( $\text{H}_2\text{O}$ ) under the influence of a catalyst. It is a very volatile liquid with a penetrating odour, and on exposure to the air gradually oxidises to acetic acid. The term *aldehyde*, when used without qualification, often refers to this compound. *Acetaldehyde* is of importance in the chemical industry.

**Alden**, John (1599–1636), one of the Pilgrim Fathers who sailed for America in the *Mayflower*. In *The Courtship of Miles Standish* Longfellow tells the story of his courtship of Priscilla Mullens.

**Alder**, see ALNUS.

**Alderman**, a title handed down from A.-S. times, the word then being 'caldorman.' In those times the title was held by various distinguished persons, and in the very earliest times the ealdorinen came next to the king. These caldormen were nobles by birth, and their office was both civil and military. There were also special titles applicable to certain offices, such as 'aldermannus totius Angliæ,' 'aldermannus regis,' and others. They seem to have been at the height of their power during the time of Alfred the Great, and from then until the time of the Norman Conquest the nature of the office gradually changed, until the word was applied to men holding certain municipal offices.

In modern times A. are members of the tn. and city corporations, and hold certain powers in those places. The Local Government Act, 1933, provides that one-half of the number of the senior aldermen of a co. council must retire in every third year, being the year in which co. councillors are elected. In the City of London, which is divided into 26 wards, there are 26 A., and the lord mayor is elected from among the A. In England, Wales, and Ireland A. possess, by virtue of their office, certain judicial powers in their own particular cities and tns., but in America they have powers of legislation rather than of judicature except in some cases. As each Amer. city is governed under the laws of its own special charter, and as the provisions of these charters vary greatly, such an official as an A. has vastly different powers in different places. For example, Chicago is governed by supervisors, Boston by an elected council, Washington by commissioners, and New York by a board of A. directly representative of the popular vote. Broadly, however, A. in America form legislative bodies, and, though they have the powers of magistrates in some cases, these powers are of a restricted nature, relating particularly to civic business, the control of the police, and similar functions. In New York or in other Amer. cities where the A. are the controlling body, the powers of these officials are far greater than are usually associated with the office in England; but the mayor, who is their chief and who is elected by the whole city, has also a large authority in the initiation and veto of measures.

**Alderney** is one of the group of is. known as the Channel Is., and lies N. of Jersey and Guernsey. It is separated from the Fr. coast by a strait known as the Race of A., and to the W. of this is. lie the Casquets, dangerous rocks which have been the scene of many shipwrecks. The coast is mainly rocky, though on the N. there are bays. The tn. of St. Anne stands in the centre of this is., where the soil is very fertile. The is. itself is

subject to the jurisdiction of Guernsey, and belongs to Great Britain. A. was occupied in the Second World War by the Gers., who evacuated all the islanders and left it finally in ruins. Pop. 800.

**Aldersgate**, a ward and street of the City of London, the street running northwards from St. Martin's-le-Grand to Goswell Road. The old gate is mentioned about A.D. 1000 as Ealdredesgate, and was probably named after someone of that name, but Stow's opinion is that the name referred to its age. John Day, the Elizabethan printer, is said to have lived in the gatehouse, together with John Foxe (see Taylor's *London*). The gate was restored after being burned in the Fire of London but eventually taken down in 1761. The dist. was much damaged by Ger. air raids in 1940-41.

**Aldershot**, a tn. in Hampshire, England. At first only a small vil., it grew into importance owing to the establishment of A. Camp in 1854-55, on the borders of Hampshire, Surrey, and Berkshire, which is the largest permanent military camp in the United Kingdom. The barracks and grounds cover an area of nearly 3 sq. m. At first there were only wooden huts, but these were replaced by brick huts and barracks, and there is also a brick hospital. The bell in the tower of the Cambridge Hospital is made from guns captured at Sebastopol. The gov. grounds around are used for manoeuvres, and during the summer regular troops are encamped there, and Territorial Army units also go there for a fortnight. In the earlier years the troops quartered here were termed the 'Division of A.' In 1870 they and their station became the 'A. Dist.', and in 1901 the 'First Army Corps (A. Dist.)'. In 1902 the name was changed to the 'First Army Corps (A. Command)', and in 1904 it became the 'A. Command'.

It is estimated that about 3,000,000 men were stationed in the A. Command during the First World War; and it was from A. that most of the 'contemptible little army' went out to Flanders. The highest number stationed in the command at one period was 140,000. There were 60,000 troops on Laffan's Plain for Queen Victoria's Jubilee review, and nearly 100,000, including detachments from every part of the empire, on the occasion of Queen Victoria's Diamond Jubilee review. Pop. 34,300.

**Aldgate**, a ward and street of the City of London, the street, connecting Fenchurch Street with Whitechapel. The old gate, which was called Eastgate in the Saxon period and, later, Alegate, was the extreme E. gate of the City. Recent excavations establish that it was formerly the site of a Roman gate. It was rebuilt in 1608 and finally demolished in 1761. Chaucer lived in the old gatehouse under lease from the corporation (Taylor's *London*). The chief remaining old-time feature of A. is the pump.

**Aldhelm**, see EALDHELM.

**Aldine Press**, see under MANUTIUS.

**Aldred** or **Ealdred**, an Eng. churchman who became abbot of Tavistock about

1027; in 1044 he became bishop of Worcester, and in 1060 archbishop of York. He it was who carried on the negotiations with the Emperor Henry III. for the return to England of Edmund Ironside's son. He visited Jerusalem, being the first Eng. prelate to do so, about the year 1058. He surrendered to William after Hastings.

**Aldrich, Henry** (1671-1710), was an Eng. ecclesiastic, educated at Westminster School and Christ Church, Oxford, where he succeeded Massey as dean in 1689. He wrote *A Compendium of Logic*, 1817—used at Oxford for a long time; he also composed church music. He designed Peckwater Quadrangle and All Saints' Church at Oxford.

**Aldrovandi, Ulissi** (1522-1607), a celebrated It. naturalist, b. at Bologna. In 1553 he took his medical degree at Bologna, and occupied the botany and natural hist. chairs of that univ. He estab. the botanic gardens at Bologna in 1567, and also formed a natural hist. museum. He traveled in almost every part of Europe to collect information for his great work on natural hist., the first vol. of which was pub. in 1599. The complete work was not pub. until 1608. He was imprisoned as a heretic at Rome, but was afterwards released.

**Aldstone**, see ALSTON.

**Aldus**, see MANUTIUS.

**Ale**, generally a synonym for beer (*q.v.*). The application of the term varies according to locality, but it is never used to denote the black beers, stout, and porter. Mild A. is beer with a good proportion of sugar and a fairly dark colour. Pale A. usually differs little from what is known as bitter beer; it is light in colour, and has a pronounced hop flavour. The term ale often has a connection with the periodic or festive nature of brewing or drinking, as in Oct. A., Whitsun A., audit A., harvest A., and bridal (originally bride-ale).

**Aleatory Contract** (Dice-players' Contract), a legal term used of an agreement involving risk of loss or the chance of gain and dependent on a hazardous event. Under this head are wagers and insurance.

**Ale-conner**, or **Ale-kenner**, is one who knows what good ale is. In anct. times in this country As. or ale-tasters (called *gustatores cerevisiae*) were appointed annually in the court-leet of each manor, in hors. and corporate tns., to see that the ale was good, and that it was sold at proper prices. In the city of London they are appointed to examine the ale and the measures in which it is sold.

**Alecto**, in Gk. mythology the sister of Megæra and Tisiphone. These 3 sisters were known as the Erinyes or Furies, and pursued the guilty. The most famous victim of their vengeance was Orestes, pursued on account of the murder of his mother, Clytemnestra.

**Alehouses** were houses where ale was sold. In 1496 an Act passed 'against vacabounds and beggars' (11 Hen. VII. c. 2) contained a clause regulating A., and from that time different Acts were passed for that purpose. In 1528 a general Act

to regulate the granting of A. licences was passed (9 Geo. IV. c. 61), which repealed all former statutes on this subject. See LICENSING LAWS.

**Alekhine, Alexander** (1892-1946), chess-master, *b.* in Moscow, son of a Russian nobleman; studied law at the Univ. of Paris, taking doctor's degree. Formerly a Russian civil servant and a member of the Duma, his career was broken by the Revolution and he emigrated to France in 1921, and became a naturalised Fr. citizen. He won the title of master at chess in 1909, when, at 16, he took the prize in the St. Petersburg amateur tournament. In the Carlsbad international tournament of 1911 he attracted the attention of all chess players, tying for eighth place in a tourney which included nearly every great chess master of the time. In 1914 he tied for first place with Nimzovitch in the Russian national tournament, winning the title of grand master, and in the succeeding world tournaments he won third prize, and in the next tournament, at Mannheim, he was leading when the First World War broke out, and he was interned at Baden; but escaped and served on the Galician front, was wounded and spent some time in a hospital at Tarnopol, where he played a brilliant series of blindfold games the results of which are to be found in his books. From 1921 he dominated the chess world with a remarkable series of first prizes. Then, in 1927, he challenged the world champion, Capablanca, and won the title after a protracted match. As world champion he was even more successful than before. At San Remo in 1930 and Blea in 1931 he was sev. points ahead of his nearest rivals. He was the world's champion again in 1934 by defeating Bogoljubov; but in 1935, in the Netherlands, Dr. Max Euwe beat him (15½-14½ points), owing to his underestimating his rival's powers and his lack of adequate training for the match. But in 1937 he beat Euwe (17½-12½ points). After these triumphs his skill seems to have waned, and in the Avro tournament he was equal fourth, fifth, and sixth, behind Keres, Fine, and Botvinnik. His last big tournament before the Second World War was at Buenos Aires in 1939. Arrangements had been completed for a championship match between him and Michael Botvinnik, the Russian champion, when he *d.*, this being the first occasion in the hist. of the game when the holder has *d.* while still champion. At his best period he was perhaps the greatest player the world has ever seen. The variations in the openings he discovered and popularised are many, and he was one of the best and most lucid annotators, as many be seen from his books, *My Best Games of Chess, 1908 to 1923*, and *My Best Games of Chess, 1924 to 1937*.

**Alemán, Mateo**, a famous Sp. novelist, was *b.* at Seville about the middle of the sixteenth century, and *d.* in Mexico about 1610. He was the author of the famous and popular novel entitled *Guzmán de Alfarache*, Madrid, 1599. This work, which was trans. into Eng. in

1622, is one of the many novels called *picarescas* which about that time appeared in Spain, and professed to describe the life and manners of rogues, vagabonds, and beggars. The Sage's *Guzmán de Alfarache* has no resemblance to the novel by A. In 1604 A. pub. a life of St. Antonio de Padua, and in 1609, in Mexico, pub. *Ortografía castellana*.

**Alemanni, Alamanni, or Alamans** (Old Ger. *alle mann*, all men), a warlike confederacy of sev. Ger. tribes which was formed between the Danube, the Rhine, and the Main about the second century A.D., and from the third to the fifth century was frequently at war with the Romans. Caracalla (A.D. 214), Severus, Maximinus, Postumus, Julian, and Valentinian were successively their opponents, but they were not crushed until Clovis defeated them utterly in the battle of Tolbiac, 496. At one time they extended their dominions to the Vosges and to the Alps. It is from this people that the Fr. derived the words *Allemagne* and *Allemand* for Germany and a German respectively.

**Alembert, Jean le Rond d'** (1717-83), was *b.* in Paris, and obtained his name from St. Jean le Rond, the church near which he was found when a baby. In 1711 he became a member of the Academy of Sciences, and in 1713 pub. his work, *Traité de dynamique*, explaining 'A.'s Principle.' He helped Diderot to prepare his *Encyclopédie*, and was in 1751 admitted to the Académie Française. See M. Müller, *Essai sur la philosophie de Jean d'Alembert*, 1926.

**Alembic**, an apparatus, now obsolete, used by alchemists for distilling.

**Alemtejo** is the largest prov. in Portugal. It is very mountainous in the E., and is watered by the Tazus, the Guadiana, and the Sado. In the E. there are extensive forests, and the valleys are fertile. In the W. there are large treeless plains where sheep and goats are reared. The other productions include cereals, wine, fruits, and oil. The iron and copper mines are worked but little. The cap. and chief tn. is Évora. Area, 9300 sq. m. Pop. 588,000. See Borrow's *The Bible in Spain*, 1843.

**Alençon**, a Fr. tn. in the dept. of Orne, and its cap. Its church of Notre-Dame—of the fifteenth century—is noteworthy for its architecture, and there are remains of the old castle of A. This tn. is noted also for its *point d'Alençon* lace. Pop. 17,700.

**Aleppo** (Turkish, *Haleb*), the cap. of the district of A., N. Syria, situated on the Kuweik in a fertile valley, but beyond is the Syrian desert. It was formerly the great trade centre between Europe and Asia, and exported silk, cotton, and woollen goods to the E. The discovery of the Cape route to India damaged its trade; and its capture by the Turks, 1517, the earthquake of 1812, the plague of 1827, and the cholera of 1832 added to its ruin. Nevertheless it was recovering from its misfortunes, and before 1914 was still an important commercial centre. During the advance

of Gen. Maude against the Turks after the capture of Bagdad in Mar. 1917. A., together with Mosul, became the pivotal positions of the Turks' last lines of resistance. But for the intense heat in Mesopotamia at that time and the occurrence of the Russian revolution, there is little doubt that Gen. Maude could, in conjunction with the Russian forces, have trapped the whole Turkish army. The tn. was eventually taken on Oct. 26, 1918, by Gen. Allenby, the Ger. general, Liman von Sanders, with the Turkish general staff fleeing to Alexandretta. After the war the tn.

**Alesius, Alexander** (1500-65), a Scottish divine, b. at Edinburgh and educated at St. Andrews. He was a strong supporter of the Reformation, settled in Wittenberg, where he became a friend of Luther and Melancthon, and signed the Confession of Augsburg.

**Alessandria**, the cap. of the prov. of A. in Piedmont, N. Italy. It is a fort. tn. and a railway and trading centre. It was built in 1168 by the Lombard League as a bulwark against Frederick Barbarossa. The citadel is a very strong fortress, and there is a beautiful cathedral. The manufs. consist of linen and woollen



I. W. Hutchison

ALEUTIAN ISLANDS: UNALASKA VILLAGE AND DUTCH HARBOUR

and ter. of A. were united with Damascus to form the single ter. of Syria under the Fr. mandate. A. is a centre of the silk industry and tobacco production. The railway from A. to Rayak (200 m.) was opened in 1926. The Iraq oil pipe-line has one of its 2 termini at A. Silk and cotton goods, leather, wheat, and other grains, carpets, tobacco, and wine are exported through Latakia, its port. Pop. (tn.), 255,000, which consists mainly of Gks., Armenians, Jews, and Muslims. In 1939 the sanjak of Alexandretta was ceded by France to Turkey. See Kemal-Eddin, *Chronique d'Aleppo* (1097-1146), 1884; A. Russell, *Natural History of Aleppo*, 1794; *Cambridge Ancient History*, vol. II, 1924.

**Aleschans**, see ALISCANS.

**Alesia**, usually identified with Alise-Sto. Reine, was the scene of Caesar's victory over Vercingetorix in B.C. 52, which victory completed his conquest of Gaul. From 1862 to 1865 and onwards excavations have been made at Alise-Sto. Reine, and a statue of Vercingetorix stands near that tn.

goods and macaroni. Pop., prov., 755,000; tn., 79,000. Area of prov. 1970 sq. m.

**Aletschhorn** is one of the highest peaks in the Bernese Alps, being 13,721 ft. It was first ascended by Tuckett in 1859. The Aletsch, between 12 and 13 m. long, is the largest glacier in Switzerland, and at its E. extremity is the Marjelen Lake.

**Aleurone Grains**, or proleil grains, are solid granules of proteid substance which act as reserve stores of food for the embryonic plant. They occur in the general protoplasm of the plant but especially in the seeds. In shape they are round or oval, and they contain mineral matter in the form of a *globoid* of lime and magnesia or a crystal of calcium oxalate. In oily seeds, such as the brazil-nut, there is also a *proleil crystalloid*.

**Aleutian Islands**, a chain of about 150 is., extending westwards from the peninsula of Alaska towards Kamchatka, the greater number of which belong to the U.S.A. They were first explored by Russians in 1768, and Captain Cook in

1778 made further explorations. The is. are mostly barren—attempts have been made at cultivation, but with little success. Many of the mt. summits are volcanoes. The largest is, Unimak, which contains 2 active volcanoes, and, excepting Attu, is the nearest to the mainland of Alaska. The only industries are fishing—whale and seal—and hunting. Unalaska is the chief is. for trade. It has a good harbour, par. church, and trading establishments. The exports are fish and furs. The inhab. are of Eskimo origin, and they belong to the Gk. Church. In June 1912 the Jap. made a descent on Attu, the westernmost is., under cover of a raid on the Amer. base at Dutch Harbour. At this time the A. I. (apart from Unalaska), were undeveloped, unfortified, and uninhabited for the most part, but they are of strategic importance, for Attu is the bit of Amer. ter. nearest to Japan (1200 m.), and the occupation by Japan put her within 1000 m. of the Alaskan Peninsula. The occupation of Attu was soon followed by an equally unopposed occupation of Kiska, which has a good harbour. But in Aug. the Amers., by rapid construction, estab. a defended air station on one of the Andreanovski group, the next in the chain to Rat Is., of which Kiska is the chief. From this airfield the Amer. bombers frequently raided Kiska. Pop. 1083.

**Alewife**, the popular name of a Malacopterygious fish belonging to the Clupeidae, probably so called from a fanciful resemblance to the stout hostess of an ale-house. It is 8–10 in. long, and is common in N. America. It is related to the herring and sprat, and is used for food.

**Alexander**, a Jewish prince, son of Aristobulus II. and grandson of Jannæus, was taken captive in Judæa by Cn. Pompeius, but escaped. He was defeated near Jerusalem, 57 B.C., by Marcus Antonius, who had been sent against him by Gabinius, governor of Syria. A., however, conquered Judæa, put many Romans to death, and besieged the rest in Garizin. At last he was defeated by Gabinius, and beheaded by Metellus Scipio by the order of Pompey, 49 B.C. See Josephus, *Antiquities of the Jews*, xiv. 5, 6, 7.

**Alexander I. of Bulgaria** (1857–93) (Prince A. of Battenberg). Nephew of the Tsar A. II. of Russia, he was, on the proposal of Russia, elected first sovereign prince of Bulgaria (1879). He met with considerable difficulties owing to the opposition between the Russophil conservative elements and the patriotic nationalist party, and, finally, in 1886, was compelled to abdicate.

**Alexander I.**, king of Epirus (336–326 B.C.), was the son of Neoptolemus and brother of Olympias, the mother of A. the Great. In 332 he went to Italy to aid the Tarentines against the Lucanians and Brutii. He was defeated and slain in battle in 326, near Pandosia, on the banks of the Acheron in southern Italy.

**Alexander II.**, king of Epirus, son of Pyrrhus and Lanassa, succeeded his father 272 B.C.

**Alexander, King of the Hellenes** (1893–1920), second son of King Constantine, on whose dethronement he ascended the throne of Greece, June 14, 1917. His gov., with Venizelos as Premier, enjoyed the confidence of the W. powers. He married in Nov. 1919, Aspasia Manos, an Athenian lady, who bore him one posthumous child—a daughter. During his reign the boundaries of Greece were much extended. He d. of blood-poisoning, Oct. 25, 1920, as result of a monkey-bite, at Tatoi.

**Alexander I.**, king of Macedonia (c. 505–454 B.C.) was the son of Amyntas I., whom he succeeded. He had to submit to the Persians, and, though he secretly favoured the cause of the Gks., he accompanied Xerxes in the invasion of Greece, 480 B.C.

**Alexander II.**, sixteenth king of Macedonia (369–367 B.C.), was the son of Amyntas II., whom he succeeded. He reigned only one year and a few months.

**Alexander III., or the Great** (356–323 B.C.), was the son of Philip II. of Macedonia and his wife Olympias. He was b. at Pella, and received his education partly at the hands of Aristotle, who seems to have invested him with a deep and lasting love for Homer, and partly in the court of his father, where the numerous coming and going of embassies must have given his education its practical side. Nor was his education in the art of war neglected, for at the early age of 16 he quelled a rising that had broken out at home in his father's absence. Quarrels occasioned by the repudiation of his mother and the marriage of a new wife by Philip II. caused his withdrawal from the court, and later his at least open reconciliation with his father. Whether A. was involved or not, it was during the period when he was under a cloud and likely to be ousted from his position as heir to the throne of Macedonia that Philip fell at the hand of the assassin in 336.

Recognised by the army, he had no difficulty in obtaining his father's throne; although the assassination caused some slight unrest and a tendency in the hill tribes towards revolt, he was in the same year recognised as generalissimo of the army of the Gks. against the Barbarians. Striking at the Barbarians of the N., and crushing a revolt in W. Macedonia, he was forced to strike at Greece, by a revolt of the Thebans. There was no hesitation in the policy he adopted, Thebes had revolted, therefore Thebes must be crushed, and to all intents and purposes Thebes was wiped out of existence. The Gk. alliance against the Barbarians was renewed, no hostility being openly shown.

Early in 334 A. crossed into Asia Minor, to attempt to carry out the great plan of the Gk. federation, the liberation of the Gk. cities from the tyranny of Persia. The defeat of the Persians at the battle of Granicus gave into his hand the headquarters of Persian gov. and almost all the Grecian cities. In most of the cities were estab. democracies under the supervision of A. and his officers. Only in the tus. held by mercenaries of the



Persians did he meet with any resistance. Ephesus and Miletus fell, and Halicarnassus surrendered after a prolonged siege. A. showed clearly, however, that he came not only as a liberator, but as a conqueror. The conquered provs. were placed under the control of Macedonian governors, A. himself received the submission of the Gk. cities of the seaboard, and even the inland uplands were attacked. The attempt to break down the conquest of A. by a naval attack upon Greece failed owing to the death of the Persian admiral (Memnon). A. now determined to attack the Persians in Syria, and passed down on his journey to N. Syria too quickly for interception by



*Glyptothek, Munich*

#### ALEXANDER THE GREAT

the Persian army dispatched by Darius III. In N. Syria, however, he found waiting an army under Darius himself. Slipping past the Persian army, he turned and routed them at Issus, while the Persians were making a vain attack to cut his line of communication. A. had set himself to conquer the whole of the Persian empire; the negotiations of Darius were useless, A. began the detailed conquest of Syria. Tyre, after a 7 months' siege, surrendered, and its inhab. were sold into slavery. Gaza met with the same fate, Syria was conquered, the road to Egypt lay open to him.

To the Egyptians A. came as a god, a liberator from an accursed tyranny. Here he met with no resistance, and here he stayed during the winter of 332-331. The city of Alexandria owes its existence to this great conqueror, who founded it at the mouth of the Nile. By his command of the coasts he had broken up almost entirely the naval power of Persia; he was free now to strike at the heart of the Persian empire. Again traversing Syria, he made his final arrangements at

Tyre, and then struck straight into the heart of Persia. Near Nineveh he found the army of Darius waiting for him, and here, at the battle of Arbela, he drove before him in complete route the last great army of the Persians. The treasures of the Persian empire were at his disposal, Babylon fell into his hands, the richest provs. were secured. At Susa he seized the treasury of the Persian royal house, an almost fabulous amount of riches. Even the mt. tribes were subdued, and learnt to regard the conqueror of Persia as their conqueror also. Pursuing the defeated king from place to place, A. at last came up with him S. of the Caspian, and here the fallen monarch was assassinated by the small band of followers who still clung to him. A. was still to meet with serious opposition. The crown of the dead king was assumed by Bessus, and A. had to turn back to put down the new revolt. But here also we find the beginning of the Macedonian opposition to A. He was no longer the king of Macedon alone, he had conquered a great empire, he had worshipped at the Egyptian temples, he had worn the dress of a Persian; he was no longer the Gk. captain-general, he was an oriental despot. The discontent showed itself in conspiracy, which was immediately put down by the execution of the ringleaders.

In 328 Bessus was at last captured and executed, and during the following year A. was busy putting down revolts and planting Gk. colonies. But the quarrel between A. and his Macedonian followers was still apparent, and showed itself in a number of gloomy incidents, amongst which can be numbered the murder of Clitus and the execution of Callisthenes, the nephew of Aristotle. By the end of 327 A. was preparing for his great invasion of India. Meeting with great opposition from the hill tribes, he succeeded in reducing most of their fortresses and reaching the Indus. Already by the time A. reached the Indus it had been bridged, and he immediately led his armies into the Punjab. Here, ending upon the hostility of rival kings, he easily obtained an ally, and reached the Hydaspes. Here he found King Porus awaiting his arrival, prepared to dispute his passage. Crossing the riv., he engaged Porus in battle, and was successful. Porus fell into his hands, and afterwards became one of his firmest allies. Moving slowly eastwards, A. had just reached the Gato of the Ganges, when the final movement in the Macedonian revolt came; the Macedonian army refused to move further eastwards. After a struggle lasting 3 days A. gave in and the return westwards began. The gov. of the E. Indus fell into the hands of the native princes, chief amongst whom was Porus; the W. portion of his Indian conquest remained in the hands of Macedonian governors. The Indus to its mouth still remained unexplored, and to this task A. now set himself. In 325 A. at last reached the mouth of the great riv., seeing for the first time the ocean.

The return from India was accompanied by great hardships, when the journey did not lie along the sea coast, but had to be undertaken inland. On his return A. applied himself immediately to administrative reorganisation. During his absence many abuses had grown up, many offices were held by incapables; it now remained for A. to set up in proper working order his empire. He attempted to a great extent to fuse the races of Macedonia and Persia, taking to himself Persian wives and inducing his generals and even the rank and file of the army to intermarry with the Persian race. The eyes of the world were all turned upon the greatest conqueror it had known, and A. received embassies from all parts of the known world. Another great enterprise had been planned from Babylonian fleets had been built, and armies especially trained, when A. developed fever. The disease was not regarded seriously at first, but rapidly became worse, and 10 days after the outbreak of the disease the Macedonian army were allowed one by one to pass through the chamber of the dying prince in order to bid him farewell. On the following day he *d.* (323). See *Anabasis* of Arrian and the *Lives* by Q. Curtius Rufus and Plutarch; also Jacob Abbott, *History of Alexander the Great*, 1848; J. W. MacCrimmon, *The Invasion of India by Alexander the Great*, 1893; D. C. Hogarth, *Philip and Alexander of Macedon*, 1897; A. E. P. Weigall (1933), and L. V. Cummings (1940), *Alexander the Great*; H. Lamb, *Alexander of Macedon: The Journey to the World's End*, 1917.

**Alexander** (1461-1506), king of Poland and grand duke of Lithuania. He became grand duke of Lithuania in 1492 and king of Poland in 1501.

**Alexander**, the name of 8 popes: Alexander I. (106-115), Alexander II. (1061-73), Alexander III. (1159-81), Alexander IV. (1254-61), Alexander V. (1469-10), Alexander VI. (1492-1503), Alexander VII. (1655-67), Alexander VIII. (1689-91).

**Alexander I.** (1061-73) was the nominee of Hildebrand, whose policy he carried out in preparation for the accession of Hildebrand himself (Gregory VII.). He it was who sanctioned the Norman invasion of England and sent the sacred banner to William the Conqueror.

**Alexander III.** (1159-81) succeeded Adrian IV.; his appointment was opposed by Frederick Barbarossa. Held the third Lateran Council, 1179. Sanctioned Henry II.'s invasion of Ireland, and humbled the same king after the murder of Becket. Spent the latter part of his pontificate in exile, being driven from Rome by the republic.

**Alexander VI.** (1492-1503) (Rodrigo Borgia), *b.* in 1431 in a little Sp. vil. near Valencia, was by the influence of his uncle, Calixtus III., rapidly advanced in the Church. He became successively bishop, cardinal, and vice-chancellor, and served in the Rom. court under 5 popes. During this period he acquired wealth, influence, and position. His 2 out-

standing sins were his love for gold and women. In an age when immorality was not regarded as a serious vice he called down on himself the censure of the Church. His children by his mistresses seem to have formed the basis of his ambition, since for them he did all that he possibly could. By a system of judicious and gigantic bribery he became pope on the death of Innocent VIII. At first his period of power was quiet and satisfactory, but he soon left no doubt as to his exact policy. A system of nepotism began, which even in an age of nepotism frightened his contemporaries by the lengths to which he went. To advance his son, to make a splendid marriage for his daughter, he was prepared to spend the wealth of the Church or to destroy the peace of Italy. The secularisation of the Church was carried to unheard-of lengths. The Church was to A. merely a means of carrying out his schemes for the advancement of his family. Even if all the stories of his poisonings and immoralities cannot be accepted, there still remains no doubt that he was guilty of many. He was a great patron of art, and during his pontificate many treasures of art were produced for him. He employed Raphael, Michelangelo, Pinturicchio, at one period or another. He *d.* on Aug. 18, having dragged down the Church to the lowest depths to which even in the Renaissance days she had descended. His most famous, or infamous, children were Giovanni, duke of Gandia (1474), Cesare (1476), and Lucrezia (1480). See BORGIA.

**Alexander**, the name of 3 emperors of Russia: Alexander I. (1777-1825), Alexander II. (1818-81), Alexander III. (1845-94).

**Alexander I.**, son of Paul I., was *b.* on Dec. 28. No Russian monarch has ever had such weird and contradictory characteristics. The irreligious court of Catherine II. made him a freethinker, the teachings of his tutor made him a disciple of the school of Rousseau, his military training gave him full possession of the Russian ideas of autocracy; of such a strange medley was the character of A. formed. Succeeding to the throne in 1801, he proceeded to undo the policy of his predecessor, and renounced the armed neutrality of the N. By 1808 he had after a desperate resistance come over to the side of Napoleon. But the campaign of 1812 completely upset his high-strung and nervous temperament, and henceforward he poses as the peacemaker of Europe. After the coyness of Vienna his great plan was the confederation of Europe, and for this purpose was formed the Holy Alliance. But the action and reaction of Europe after 1815 alarmed him, and a revolutionary Germany caused him to modify his liberal ideas. Towards the end of his reign he was greatly under the influence of Metternich, and the final act was reached with the tsar proclaiming himself the natural defender of the Christian Church in the Ottoman empire. In 1825 it was announced that he had *d.* in remote Crimea, though whether he really *d.* or

only disappeared is still a debated question (Pares).

**Alexander II.** (1818-81), the eldest son of Nicholas I. Six years after his accession he emancipated the serfs (1861). His foreign policy raised Russia to a high place in the councils of Europe, and at the same time strengthened her resources. He was assassinated in Mar., the victim of a nihilist plot, the actual body responsible, 'The Will of the People,' being one of the then 2 main Socialist parties, but in fact the assassination was the work of not more than 100 persons (Pares).

**Alexander III.**, second son of the Emperor A. II., was b. on Mar. 18, 1845. He reversed to a certain extent the liberal policy of his predecessor, and proceeded to rule on autocratic lines.

**Alexander 3** (kings of Scotland).

**Alexander I.** (usually surnamed the Fierce), fourth son of Malcolm Canmore, succeeded his brother Edgar in Jan. 1107. He ruled over Scotland N. of the firths of Forth and Clyde, the kingdom of Cumbria being given as an appanage to his younger brother David. He succeeded in establishing firmly the royal authority in the N. During his reign the independence of the Scottish Church was established. He married Sybille, a natural daughter of Henry I., and *d.* childless in 1124.

**Alexander II.**, son of William the Lion, succeeded to the Scottish throne in 1214. From the time of his accession he was in communication with the still disaffected N. barons, and, despite the stipulations in Magna Charta on behalf of the Scots, he joined forces with the barons when hostilities again commenced. He laid siege unsuccessfully to Norham, and the N. barons did homage to him. He retreated before the army sent against him by John, an army which successfully laid waste the border cos. of Scotland. This border war continued until 1217. In 1216 A. showed still further his hostility to John by making a special journey to Dover to pay homage for his Eng. possessions to Louis of France. He married the daughter of King John (Joanna) in 1217, and during his reign the definite boundaries of the 2 kingdoms seem to have been fixed, though no formal frontier was drawn. The usual quarrels during the reign of Henry III. with regard to the homage question resulted in a treaty at Newcastle in 1244, by which A. II. pledged himself not to enter into any treaty hostile to his 'hege lord,' Henry III. He *d.* in 1249, and was succeeded by his son, Alexander III.

**Alexander III.** succeeded in 1249 and ruled until 1286. He was successful in bringing the W. Is. under his power in 1263. The later period of his reign was devoted to administrative reforms, which limited the power of the barons and brought Scotland a period of peace and prosperity, such as that country was not again to enjoy for some time. He was killed in 1286 by falling over the cliffs near Kinghorn, and left as his heiress his granddaughter, the Maid of Norway.

**Alexander I.**, king of Syria (150-146 B.C.), surnamed Balas. He pretended to be a son of Antiochus IV., Epiphanes, and usurped the throne of Syria from Demetrius I. Balas was, however, defeated and dethroned by the son of Demetrius, who came to the throne as Demetrius II.

**Alexander II.**, king of Syria (128-122 B.C.), surnamed Zebina or Zabinas, was sent by Ptolemaeus Physcon, king of Egypt, to usurp the throne from Demetrius II. Demetrius was defeated and Zabinas came to the throne. He, however, refusing the ann. tribute to Ptolemaeus Physcon, was attacked by the Egyptians and put to death.

**Alexander** (1888-1934), king of Yugoslavia; b. Dec. 4, at Cetinje; second son of Prince Peter Karageorgievich (Karagorgievic). A's mother was a daughter of Nicholas, reigning prince of Montenegro. His early days were passed at Geneva, where his father lived in exile. The family being favoured by Russia, A. was sent to St. Petersburg in 1899, to be educated. In 1909 he rejoined his father in Serbia, where the latter was now king. A's elder brother George having been obliged to renounce his claim to the succession, A. was recognised as heir. He distinguished himself in the Balkan war of 1912; and he was appointed regent by his father, June 24, 1914. He was with the Serbian army in its retreat before the central powers; then headed the Serbian Gov. in exile at Corfu, and visited the W. Allies' camps. He returned to his army; and at the Yugoslav National Council at Zagreb, Dec. 1, 1918, he was appointed regent. His father dying Aug. 16, 1921, A. became king. He married, June 8, 1922, Marie, daughter of King Ferdinand of Rumania. On Jan. 6, 1929, owing to parl. difficulties, he suspended the constitution, and created a dictatorship. He was assassinated in Marseilles on Oct. 10, 1934, by a Croat subject a few moments after he had disembarked there. M. Barthou, Fr. foreign minister, who was in the same motor-car, was also killed by the bullets of the assassin who was killed on the spot by a Fr. officer. A. had gone to France for negotiations on the question of the Adriatic in its bearing on Fr. foreign policy, the immediate object of the negotiations being to find means of establishing closer contact between Italy and Yugoslavia as the essential preliminary of a *rapprochement* between France and Italy.

**Alexander, Albert Victor** (b. 1885), Brit. labour politician. b. at Weston-super-Mare, son of an artisan engineer, educated at St. George technical classes. Secretary, parl. committee, Co-operative Congress. Chief clerk for higher education, Somerset Co. Council till 1920. For some years a Baptist lay preacher. M.P. (co-operative) Hillsborough div. of Sheffield, 1922-33 and since 1935. Parl. secretary to the Board of Trade, 1924. P.C., 1929. First Lord of the Admiralty, 1929-31, in Ramsay MacDonald's first Gov., and, again, in 1940, in the national Gov. of Mr. Winston Churchill and in the

Labour Gov. in 1945; minister of defence, 1947.

**Alexander Nevsky** (1220-63), grand duke of Vladimir, second son of the grand duke of Yaroslav. Was ruler at Great Novgorod, and spent the early part of his life in fighting against the Gers, and Poles, who were continually endeavouring to win it from Russia, which was still suffering from the great Tatar invasions. His most memorable battle was fought against the Swedes on the banks of the Neva, and resulted in the total rout of the Swedes and the bestowal of the name Nevsky (of the Neva) on the young prince, 1240. He spent the rest of his life in endeavouring to ameliorate the lot of the Russians and relieve the distress occasioned by the Tatar invasion. On his death he was canonised by the Gk. Church.

**Alexander Obrenovich**, king of Serbia (1876-1903). Proclaimed king under a regent on abdication of his father, Mar. 1889. Took the gov. into his own hands in 1893. He aroused great opposition by his marriage to Mme. Draga Mashin in 1900. Murdered together with his queen by military conspirators.

**Alexander Severus**, Rom. emperor (A.D. 222-35). He was the son of Gessius Marcianus and Julia Mamaea. About the year 221 he was adopted by his cousin, the Emperor Heliogabalus (or Elagabalus) and given the title Caesar. The next year he succeeded to the imperial throne. He was noted for his piety and his justice; he numbered amongst his advisers Paulus and Ulpianus. Although a pagan, he held in high regard the doctrines of Christianity, and hated the vulgar ostentation of the Rom. court. He crushed the Persian revolt under Artaxerxes in 232. Two years later he set out for the Rhine, but was assassinated in the neighbourhood of Mainz, a victim to a military conspiracy in 235.

**Alexander of Ægæ**, a Peripatetic philosopher at Rome in the first century A.D., who was tutor to the Emperor Nero.

**Alexander of Aphrodisias** in Caria lived at the end of the second century and the beginning of the third century A.D., was a celebrated Peripatetic philosopher, and the greatest commentator on Aristotle.

**Alexander of Hales**, surnamed Doctor Irrefragabilis, a celebrated doctor of theology, b. in Gloucestershire, during the thirteenth century. He was trained in the monastery at Hales, where at an early age he became an archdeacon. He studied, as did most students, in the schools of Paris, and became a celebrated teacher there. Suddenly, about 1222, he entered the order of the Franciscans, and remained in it until his death in 1245. His most celebrated work is *Summa Theologie*.

**Alexander Polyhistor**, an anct. Gk. writer and philosopher of the first century B.C.

**Alexander the Ætolian** was a Gk. poet who lived at Alexandria in the reign of Ptolemy Philadelphus (285-247 B.C.).

**Alexander, Archibald** (1772-1851), an Amer. Presbyterian divine, b. in Virginia. In 1791, after being licensed to preach, he became known as a great and eloquent revivalist preacher. He afterwards became prof. in the newly created Presbyterian seminary at Princeton, where he remained until his death. Amongst his theological works may be mentioned the *Outlines of Moral Science*, 1852, and *A History of the Israelitish Nation*, 1853.

**Alexander, Bishop of Lincoln** (d. 1148). A. was the nephew of Roger, bishop of Salisbury. He became archdeacon of Sarum, and later bishop of Lincoln (1123). Visited Rome in 1125. Took side of Stephen in civil war, although he had sworn allegiance to Maud. Suspected of disloyalty, he was arrested, imprisoned, and dispossessed of his castles. He again visited Rome, and probably crowned Stephen in 1146.

**Alexander, Boyd** (1873-1910), noted as a Brit. explorer, b. at Cranbrook, in Kent. He took part in the famous A. - Gosling expedition (1904-7), which crossed Africa from the Niger to the Nile. It was during this expedition that his brother, Claud A., and his fellow explorer Gosling both lost their lives as a result of the hardships which they had to endure. In 1909 A. began his last, ill-fated journey. After passing Lake Chad in safety at Wadal, just on the borders of the Brit. sphere of influence in the Sudan, he was attacked by natives and killed.

**Alexander, Cecil**, see under Alexander, William (1824-1911).

**Alexander, Sir George** (1858-1918), actor and theatrical manager, b. at Reading. He was educated for a city life, but his enthusiasm as an amateur actor soon led him to the stage. He started at the Theatre Royal at Nottingham at the age of 21, and 2 years later joined Sir Henry Irving at the Lyceum. He became a manager in 1890 at the Avenue Theatre, and in the following year opened at St. James's. On the stage he could play the lover to perfection, avoiding both bathos and inawkishness.

**Alexander, Field Marshal Sir Harold Rupert Leofric George, Viscount of Tunis and of Errigan** (b. 1891), Brit. soldier, son of 4th Earl of Arundel, and educated at Harrow and Sandhurst. In First World War he held a commission in the Irish Guards and was in the Mons retreat. Five times mentioned in dispatches. While still in his twenties he was put in command of the Baltic Landeswehr, a force of some 2000 men of Ger. stock, mainly Baltic barons and retainers, who were left behind in Riga after the Ger. evacuation. In 1934 he was given the command of a brigade in India, and served in 2 campaigns on the N.W. Frontier. His name first came to be known in his own country when he was appointed to the command of the First Div. (1938). Two years later it was his task to control the final stages of the Dunkirk evacuation (1940), which he did

with conspicuous gallantry and success. After holding the S. Command for a time he was appointed to command the army in Burma, where his skill contributed to staving off any further Jap. advance in that country (1942). In Aug. 1942 he succeeded Gen. Auchinleck as commander-in-chief, Middle E. Here his presence was quickly felt, for very soon his strategy had its reward in the great victory of the Eighth Army under Gen. Montgomery at El Alamein, which completely reversed the position in Egypt and Libya; and this was followed by a series of victories on a smaller scale which took the Eighth Army into Tunisia, by which time A. had for some time been in command of the 18th Army Group in that country. In May 1943 the entire Axis Army under Gen. von Arnim was destroyed or taken prisoner. Commanded the allied armies which defeated the It. and Ger. armies in Italy in 1944-45. C.S.I., 1936; K.C.B., 1912. Promoted general, 1942. Field Marshal, 1944. After the war he was raised to the peerage and appointed governor-general of Canada. See also AFRICA, NORTH, SECOND WORLD WAR, CAMPAIGNS IN; ITALIAN FRONT, SECOND WORLD WAR, CAMPAIGNS ON.

**Alexander, Sir James Edward** (1803-1885), a celebrated Brit. soldier and traveller. He joined the E. India army in 1820. In 1825 he became an officer in the Brit. army, and later took part in the Kafir war and the Crimean war. Amongst other things, to him largely is due the transfer to England of Cleopatra's Needle, 1877.

**Alexander, John White** (1856-1915), a celebrated Amer. artist, b. in Allegheny, Pennsylvania. Amongst his works may be mentioned 'Miss Dorothy Roosevelt,' 'Pandora,' 'Rodin,' 'Walt Whitman,' 'The Quiet Hour,' 'A Ray of Sunlight.'

**Alexander, Samuel** (1859-1938), Brit. philosopher; b. at Sydney, N.S.W. Educated Wesley College, Melbourne; Univ. of Melbourne; and Balliol College, Oxford. First class in classical and in mathematical moderations, 1879; first class Lit. Hum., 1881. Scholar of Balliol, 1878. Fellow of Lincoln College, 1882-93. Gifford lecturer, Glasgow, 1916-18. M.A., Hon. LL.D., St. Andrews and Birmingham; Hon. D.Litt., Durham and Liverpool. His philosophy attaches great importance to Awareness; which, though different in kind from its objects, is derived from them—paralleling the results of chemical reactions. A. thus arrives at Emergent Evolution: the emergence of totally new things from combinations of the old. Space-time, the original matrix, gave birth to matter in varying forms; which in turn gave birth to mind. From mind, God is expected to emerge. (See his *Space, Time, and Deity*, vol. II, especially p. 399). Publications include: *Moral Order and Progress*, 1889; *Locke*, 1908; *Space, Time, and Deity*, 1920; *Spinoza and Time*, 1921; *Beauty and other Forms of Value*, 1933. He received the Order of Merit on the king's birthday, 1930.

**Alexander, Sir William** (1577-1640), Earl of Stirling. One of the lesser Scottish poets, received grant of Nova Scotia, became later secretary of state for Scotland, a position he continued to hold until his death. Amongst his works are *Tragedie of Darius, Aurora, Crenus*, and *Julius Caesar*.

**Alexander, William** (1824-1911), Protestant bishop of Armagh and primate of all Ireland, was b. Apr. 13, at Londonderry, and received his education at Tunbridge Grammar School and at Oxford (Brasenose College). He held a number of livings in the N. of Ireland before being made bishop of Derry and Raphoe in 1867. He became primate of all Ireland in 1896. He was the author of a number of theological works, and was also distinguished as the writer of *St. Augustine's Holiday and other Poems*, 1886. His wife, Cecile Frances Alexander, is famous as the author of the hymn *There is a Green Hill far away* and of numerous other well-known hymns.

**Alexander, William Lindsay** (1805-1881), a Scottish divine. He became recognised as a master of classical erudition. He ed. in 1861 the 3rd ed. of Kitto's *Biblical Encyclopedia*. From 1877 was principal of Edinburgh Theological Hall.

**Alexander Archipelago**, a congeries of is., over a thousand in number, off the coast of Alaska, U.S.A.

**Alexander Land**, a dist. in the Antarctic, lat. 68° 43', long. 70-75°, discovered by Bellingshausen, 1821.

**Alexandra**, a div. of Natal situated between the rivs. Umzimkulu and Umkomansi. It has a pop. of about 23,000, mainly coloured.

**Alexandra Caroline Marie Charlotte Louise Julie**, queen of King Edward VII. of Great Britain and Ireland, was b. Dec. 1, 1844. She was the eldest daughter of King Christian IX. of Denmark. She was married Mar. 10, 1863, and thence until the death of Queen Victoria in 1901 she was Princess of Wales. Probably the first time she was seen by her (future) husband was at Spire in 1861. The children of the marriage were 5, 2 boys and 3 girls. The eldest son, Albert Victor, Duke of Clarence, d. in 1892, and his brother reigned as George V. A.'s eldest brother became Frederick VIII. of Denmark; the second, Prince William, became King 'George' of Greece at the age of 18 (assassinated at Salonika 1913); the third, Valdemar, was an officer in the Dan. Navy. Her sister Dagmar married Alexander III. of Russia; and Thyra, the youngest, married Ernest Augustus, duke of Cumberland and titular king of Hanover. A. was much loved in England for her beauty and benevolence; and d. at Sandringham Nov. 20, 1925, in the sixteenth year of her widowhood. See Sir G. C. A. Arthur, *Queen Alexandra*, 1934.

**Alexandra Feodorovna** (1872-1918) (Alix Victoria Helen Louise Beatrice), last tsarina of Russia, b. June 6, 1872, at Darmstadt, youngest child but one of Louis (IV.), grand duke of Hesse. Her

mother (Alice, daughter of Queen Victoria) dying when A. F. was 6, A. F. was brought up partly in England. She married Tsar Nicholas II. (*q.v.*) Nov. 27, 1894. On July 30, 1904, an heir was born: Alexis; whose delicate health occasioned the subjection of A. F. to Rasputin (*q.v.*). During the First World War she influenced Nicholas's policy for the worse. When the empire fell, she shared his captivity. Slaughtered with him at Ekaterinburg (Sverdlovsk) July 17, 1918.

**Alexandria Land**, see NORTHERN TERRITORY.

**Alexandra Park**, a place of recreation in N. London. It contains the A. Palace, and was opened in 1863. The present building was erected in 1873 as the first was destroyed by fire. Ger. internees were employed there during the First World War. After the war attempts were made to renovate and utilise the palace, and the organ now installed there is one of the finest in England. The N.E. tower of the palace has been removed to make way for a television mast installed by the B.B.C., who have taken over all this corner of the building for television broadcasting. The A.P. racecourse adjoins the grounds below the front terrace.

**Alexandre, Aaron** (c. 1766-1850), a noted Bavarian chess-player. He visited nearly all the European caps, and was the author of an *Encyclopædia of Chess* and a book of *Chess Problems*.

**Alexandrescu, Grigore** (1812-85), poet of Rumania. He took an active interest in the politics of his country. His poems were collected and pub. under the title of *Original Poems, Elegies, and Fables*. His attack on the gov. and the oppressors of the people brought about his confinement in a monastery, but in spite of the fact he pub. his famous poem entitled *The Year 1840*.

**Alexandretta**, or Iskanderun, a tn. of Asiatic Turkey. The sanjak of A. was formerly included in the dist. of Aleppo, N. Syria, but is now the vilayet of The Hatay. It owes its importance to its proximity to the Helian Pass. It is the main port for the region, and has an extensive trade in tobacco, silk, cereals, liquorice, and textiles. Its climate is insalubrious owing to the marshy ground and the absence of purifying winds. Towards the end of the First World War it was occupied by Brit. and Fr. troops. After the war the sanjak of A., in recognition of the special interests of the large proportion of Turks in its pop., was accorded a special administrative regime. But in 1936 a dispute arose between France (as mandatory of Syria) and Turkey respecting the position of the Turkish pop. in the sanjak of A. under the terms of the Franco-Syrian treaty, which the Turkish gov. held to be incompatible with the Franco-Turkish treaty of 1921. After reference to the League of Nations the two govts. in 1937, agreed to a settlement by which the sanjak should remain within the orbit of Syria but with full

internal autonomy. Later, Turkish troops entered the sanjak in pursuance of an agreement with France that equal forces of Fr. and Turkish troops should assure order during elections to the new Assembly, which met in 1938. The name of the sanjak was changed to The Hatay. On June 23, 1939, France agreed to the complete cession of the sanjak to Turkey in consideration of the conclusion of a Franco-Turkish pact of assistance, and the Fr. garrison was withdrawn a few days later. Pop. 25,000.

**Alexandria**, a tn. of Dumfries, Scotland. It owes its existence to the cotton, bleaching, and printing industries there carried on. Pop. 10,359.

**Alexandria**: 1. A city of Madison co., Indiana, U.S.A., about 46 m. N.E. of Indianapolis. Its products are chiefly agric. The manuf. of glassware is a very important industry. Pop. 4000. 2. A port and city of A. co., Virginia, U.S.A. It is accessible to the largest vessels, for the riv., which forms its harbour, though 100 m. from the mouth of the Potomac, is fully a m. wide. Pop. 33,500. 3. A city of Rapides Par., Louisiana, U.S.A. Pop. 27,000.

**Alexandria**, the chief seaport of Egypt. It was founded in 332 B.C. by Alexander the Great, and was for over 1000 years the cap. of the country. It is situated on a strip of land separating the Mediterranean from Lake Marcotis.

*The Cap. City.*—In ant. times A. was divided into 3 dists. These contained respectively the Jews, in the N.E.; the Egyptians in the W., a dist. called Rhacotis; and the Gks., who lived in that part of the tn. called Bruchelion. This was by far the most beautiful part of the city. Originally the tn. was built upon a mole called Heptastadium, which joined the isle of Pharos to the mainland. Since then sedimentary deposits have added considerably to the width of the mole. A. was erected after a plan executed by the architect Democritus. It was intersected by 2 broad roads, running at right angles. The buildings in the Bruchelion quarter contained the royal palaces of Ptolemies, the Great Theatre, which was afterwards utilised as a fortress by Caesar during the siege after the battle of Pharsalus, the Poseicleion, or temple to the god of the sea, the Timonium built by Antony, the Emporium or Exchange, the temple Caesareum, now lying underneath the new sea-wall, the Gymnasium, the Palestra, the Mausoleum of Alexander, and the Museum and Library. The Necropolis lay to the W. A feature of the tn. was the number of subterranean cisterns running along the spaces under the houses and capable of holding a supply of water sufficient to last the whole pop. a year. At the height of its prosperity it contained, according to Diodorus, approximately 300,000 free citizens, while it is probable that a larger number still represents the number of slaves. The actual development of A., and the very high place it held among the most magnificent cities of the world, were due

to the interest and activities of the Ptolemies, who aimed at and succeeded in making it surpass in majestic beauty only by Rome and Antioch. Placed as it was between the E. and W., it became a centre of commerce, to which position it owed its great commercial supremacy. In 30 B.C., on the death of Cleopatra, the last of the Ptolemies, it fell into the possession of the Romans. It was now at the zenith of its glory. A great centre of Hellenism, at the same time commercially prosperous to an extraordinary degree, and also the fountain of culture and intellect, A. can be said to have held at this time a position of unique and glorious splendour. For a long time it remained in the enviable position as the world's first port. During the reign of Caracalla it sank considerably in its commercial greatness, and the rise of Constantinople only served to hasten its fall. Meanwhile Christianity had been introduced, and quickly had made headway. By the end of the second century it had taken hold of a large number of the people. The subsequent struggle between Christianity and heathenism saw many bloody affrays; but Christianity eventually triumphed, and in 389 the Serapeum, the last seat of heathenism, was captured and used thenceforth as a Christian church. The decline of A. was now more rapid. Cairo was chosen by the Egyptian caliphs to be the cap. of Egypt; the passage round the Cape of Good Hope was discovered, together with the finding of America; such significant events as these proved factors of deleterious influence upon A. Its decay seemed imminent. In 1517 it fell into the hands of the Turks, and presented but a shadow of its former beauty. Those monumental triumphs of majestic architecture so long the just pride of the Gks. were now nearly all in ruins, and the number of its inhab. had fallen to the surprisingly low number of 6000. Compared with the former pop. of over 600,000 the change is made all the more startling.

Signs of progress, however, were presently visible under Mehemet Ali. Much of its lost ground was recovered, so that to-day, while it may never again present the imposing spectacle it once was, and though the dignity of its learning has faded, yet its commercial prosperity is rising gradually, and it is once more recognised as one of the most significant of Mediterranean ports. Notwithstanding the loss of trade incurred by the cutting of the Suez Canal, ample recompense was found in the consequent advance of Egypt's commerce. In 1882 Arabi Pasha incurred Brit. displeasure by his maltreatment of the Europeans during his rising, and a Brit. fleet was dispatched. The bombardment of A. followed, and it is a regrettable fact that of the few remaining emblems of antiquity most were utterly destroyed. This was not all. A few days later the tn. was sacked and a disastrous fire ravaged a large portion of it. Among the scanty objects of antiquity that re-

main are Pompey's Pillar (so called in error) and 2 obelisks called Cleopatra's Needles, one of which is on the Thames Embankment, while the other is in New York.

*The Modern City* is built partly upon the isthmus which developed from the original mole by means of silt deposits, and partly upon a T-shaped peninsula. The cape to the W. is Ras et-Tin, while the E. cape is Pharos or Kait Bey. The Mahmudiya canal, connecting A. with the Nile, runs at the S. of the tn., and by a series of locks enters the harbour. Its climate differs from that of the surrounding country. An almost incessant rain is experienced during the winter, while the summer is rendered temperate by sea breezes. The chief exports are cotton, grain, beans, rice, etc. The relics of antiquity are the so-called Pompey's Pillar, 88 ft. high, and the catacombs of Kom esh-Shuqafa and the contents of the Museum of Graeco-Rom. Antiquities. All traces of the bombardment, etc., in 1882 have disappeared and the tn. is again quite prosperous, but it suffered damage in frequent It. and Ger. air-raids in the Second World War. In 1937 the pop. numbered 682,000, of whom over 570,000 were Egyptians; the Europeans were chiefly: 40,000 Gks., 25,000 Its., 18,000 Brit., and 10,000 Fr. In the summer the Egyptian gov. and court and the diplomatic corps moved from Cairo to A.

**Alexandrian Codex**, a MS. of the O.T. and N.T., in Gk., now in the Brit. Museum. The MS. is in 4 vols., large quarto, the N.T. being the last vol. It is written on vellum, in double columns, in uncial or cap. letters, without spaces between the words, accents, or marks of aspiration. The letters are round and well formed, a few words are abbreviated, and the MS. is in fairly good condition. There has been much contention as to its date, but it is probable that it was about 450. In 1628 it was sent by Cyrillus Lucaris, patriarch of Alexandria and of Constantinople, to Charles I., and was placed in the Royal Library. In 1753 it was transferred with this library to the Brit. Museum. A facsimile of the O.T. was pub. by the Rev. H. Baber of the Brit. Museum (1816-28), and of the N.T. by Dr. Woide (1786), and a second ed. by Spohn.

**Alexandrian Library**, a collection of books formed by Ptolemy Soter, the first king of Egypt; and probably the largest which was made before the invention of printing. It is said to have been founded about 284 B.C., in consequence of the suggestions of Demetrius Phalerus, who had seen the public libraries at Athens. Demetrius was appointed superintendent of the new establishment, and busied himself diligently in collecting literature of all nations, Jewish, Chaldee, Persian, Ethiopian, Egyptian, etc., as well as Gk. and Lat. Eusebius says that at the death of Ptolemy Philadelphus there were 100,000 vols. in the library. It was situated in the quarter of Alexandria called Brucheion. Philadelphus purchased





earliest; and Callimachus, of whose works only a few hymns, epigrams, and elegies remain, was the greatest. Amongst the lyric poets were Phaeocles, Hermesianax, Alexander of Aetolia, and Lycophron. Epigrams were also written by the Alexandrians, and Timon the philosopher was the author of 3 books of lampoons. Tragedy, too, played an important part, but none of the works of the 7 great dramatists who were known as the Alexandrian Pleiades has been preserved. Theocritus was a celebrated bucolic poet, and his *Idylls*, which are pictures of the country life of the ordinary people, greatly influenced Rom. poets, especially Virgil. Besides the poets there were the critics and grammarians of the A. S., who gave to the world the anc. Gk. writings in a form perfectly intelligible, for they devoted their time to criticism, the explanation of words, and the arrangement of the texts. Amongst these great critics were Zenodotus of Ephesus, Aristophanes of Byzantium, Aristarchus of Samothrace, Alexander of Aetolia, Lycophron, Callimachus, and Eratosthenes. Mathematics, astronomy, geography, and medicine were also treated by the A. S. Of the mathematical school Euclid was the founder; and his pupils included Archimedes, whose inventions and discoveries were very important; Apollonius of Perga, the author of a work on conic sections; Hipparchus, the celebrated astronomer, whose catalogue of the stars is preserved by Ptolemy; and Eratosthenes, who wrote on astronomy, geometry, geography, and history.

*The School of Philosophy.*—The members of this school brought together the philosophies of the E. and the W., and the Jewish notions of religion were very much influenced by Gk. ideas. On this subject the reader is advised to consult Philo Judeus. The founder of this Neo-Platonic system (see NEO-PLATONISTS) was Plotinus, who was born about A.D. 203, and whose writings his disciple Porphyry rendered in their present form. Another celebrated teacher of this system was Proclus, sev. of whose works are still extant. The Gnostics (*q.v.*) were a sect who endeavoured to unite Christian and E. ideas. Clement of Alexandria and Origen showed leanings towards that heresy. Philo Judeus made attempts to reconcile the Jewish scriptures with the doctrines of the Platonic philosophy and sev. of his works have been handed down to us.

**Alexandrina, Lake**, a shallow lake in S. Australia, near the mouth of the Murray R.

**Alexandrine Liturgy**, known also as the Liturgy of St. Mark, because he is said to have arranged it for the use of Christians in Egypt.

**Alexandrine Mosaic**, decorative work said to have been invented by Alexander Severus, Emperor of Rome (A.D. 208–235), and named after him. It was employed in the embellishment of friezes and panels. In the mosaic are embedded precious stones and jewels.

**Alexandrine Verse**, a species of verse much employed by Fr. poets, especially in poetry of the heroic or epic order. Each line in the A. consists of 12 syllables, and strictly speaking, and following the Fr. model, it should be divided into 2 hemistichs, the sixth syllable ending a word. The name A. would appear to be derived from an old Fr. poem about Alexander the Great, written in this metre towards the end of the twelfth century. Others attribute the name to Alexandre de Bernay, joint author of the above. Generally the A. line is used in rhymed couplets, and was so employed by Edmund Spenser to finish off each of his stanzas, but it has also been used by itself alone as the concluding line, and sometimes in the body, of Eng. 10-syllabled verse. Pope rallied against it in his well-known couplet:

'A needless Alexandrine ends the song,  
That, like a wounded snake, drags its  
slow length along.'

But for all that he employed it not infrequently. The longest and best poem in our language written wholly in As. is Drayton's *Polyolbion*.

**Alexandriya**, a tn. in the Ukrainian, S.S.R., Russia, situated on the Ingules, an affluent of the Dnieper. The dist. is very rich in iron ore.

**Alexandropol**, see LENINAKHAN.

**Alexandrovsk**, (Ukraine, see ZAPOROZHE.

**Alexei Mikhailovitch** (1648–76), a Russian tsar of the house of the Romanovs. He was the father of Peter the Great, whom he had by his second wife. His reign was harassed in 1648 by an insurrection. He undertook 2 campaigns against the Poles, and met with considerable success. During his reign he introduced many violently radical changes, both legislative and religious. Nonconformity with the latter gave rise to dissensions.

**Alexei Petrovitch** (1690–1718), the eldest son of Peter the Great, b. at Moscow. His openly expressed opposition to the reforms introduced by his father, Peter the Great, caused him to be excluded from the line of succession. He entered a monastery, but shortly afterwards escaped. He was sentenced to death, but later was pardoned. The strain of his trial caused his death in prison. His son, Peter II., succeeded Peter the Great.

**Alexeiev, Mikhail Vassilievitch** (1857–1918), appointed chief of staff in 1915 by the Grand Duke Nicholas Nikolaievich. A. extricated all the N. armies from the Ger. trap then closing upon them, and when Vilna was evacuated (Sept. 1915) he marched them in safety across Russia along the route of Napoleon's invaders in 1812. He was a fine administrator and made great efforts to maintain discipline in the army. In this connection he did effective work in securing more efficient control over raw peasant reserves by the Russian War Office, thereby preventing them from falling in thousands into the hands of the enemy.

Amidst all the intrigues of a pro-Ger. court and the wild policy of disloyal demagogues A. stands out as a great Russian patriot and soldier. Though dismissed by the Soviet under Kerensky for his opposition to the 'no annexation, no indemnity' clause in the note to the Allies of the Provisional Russian Gov. of Miliukov (1917), and replaced by Brussilov, he was the real brain of the Russian command in staff work, and it was through his remarkable talents as a staff officer that the new under Gens. Brussilov and Ruzsky won a series of brilliant victories against the Austrians, capturing successively positions of great strength at Halicz, Brzchany, and Tarnopol, storming Lemberg (Sept. 1914), reducing the fortress of Przemyśl (Mar. 1915); previously he had traversed the Carpathians to the very gates of Cracow. He was afterwards restored to the chief command, but soon afterwards, when the Soviet became all-powerful, went into retirement to organise the anti-Bolshevik armies, but in Oct. of the same year he d. of pneumonia.

**Alexiad**, a life of the Byzantine emperor, Alexius Comnenus, written by his daughter, Anna Comnena, and her husband, Nicephorus Bryennius. The work is 1 of the treasures of the Byzantine collection, and consists of 15 books written in modern Gk. The substance of the work is the hist. of the first crusade and the defence of Alexius against the charges of his enemies. From this life Scott drew his material for his novel, *Count Robert of Paris*.

**Alexinatz**, a tn. of Yugoslavia on the Moravitz. Pop. 6,000.

**Alexis Angelus**, name of Alexis III. (1195-1203) and Alexis IV. (1203-4), Byzantine emperors. Under Alexis III. Constantinople was taken by the Venetian and Fr. crusaders.

**Alexis, Willibald**, the pseudonym of the Ger. novelist, Georg Wilhelm Heinrich Haring (1798-1871), who was b. at Breslau. The work that brought him into prominence is a literary curiosity. It was an historical romance entitled *Walladmor* (1823), pub. as being a work of Sir Walter Scott. De Quincey trans. the novel into Eng., and Scott himself approved of it. Two more romances were pub. under the same pretence, *Die Geächelten* and *Schloss Avalon*, 1827. His other noted works are *Cabanis*, 1832; *Der Falsche Woldemar*, 1842; *Haas Jürgen* and *Hans Jochem*, 1846-48. See H. F. Kohler, '*Walladmor*' von Willibald Alexis, 1915.

**Alexius Comnenus** (1048-1118), a ruler of the Byzantine empire. He proved himself the most able of these rulers. His military prowess and the deep affection with which his soldiers regarded him alone delayed the inevitable breakup of the empire. He reigned for 37 years. See the various *Histories of the Crusades*; the collection of the *Byzantine Historians*; and particularly the *History* of Anna Comnena.

**Alexiyevka**, a tn. in the Voronezh region of the R.S.F.S.R. The tn. is situated

on the Tikhaya-Sosna, an affluent of the Don. Sunflowers are cultivated in the dist. Pop. about 20,000.

**Alfa**, a variety of sparto grass indigenous to N. Africa. It attains a height of 3 to 4 ft., and is used largely in the manuf. of paper. It is sometimes called halfa.

**Alfadir**, i.e. all-father, a common appellation of Odín in the Scandinavian mythology.

**Alfalfa**, the Sp. name for *Medicago sativa* or lucerne, called also in England medic, or purple medic, and, in the U.S.A., Sp. clover, Fr. clover, and Brazilian clover. The plant has a wide distribution in the Old World, and was introduced into America by the Sp. pioneers. It is now grown in the prairie provs. of Canada. The plant is cultivated for forage. It has small purple flowers resembling the flowers of the cultivated pea.

**Alfarabi**, an oriental philosopher who was b. at Farab by the Oxus. He studied at Bagdad and afterwards travelled. Ultimately he settled at Bagdad and lived a life marked by simplicity and retirement. The caliph honoured him and gave him a pension. He d. in 950. He wrote prodigiously upon nearly every scientific subject known. He is famous as the first writer to attempt an encyclopedia. The MS. of this first encyclopedia is in the Escorial library.

**Al-farghani**, see ALFRAGANIUS.

**Alfieri, Vittorio** (1749-1803), eminent It. dramatist: b. at Piedmont, his early education was imperfect. Succeeding to a great fortune, he travelled in a profitless manner, becoming enamoured more than once of ladies already married. The most famous of these was the wife of Charles Edward Stuart, with whom, after her unhappy husband's death, he lived. In order to forget a passionate grief that had been caused by a former love disappointment he took up literature. Among his plays, which appear to have been inspired more by political emotions than artistic promptings, are the *Abele*, the most successful; *Cleopatra*; *Filippo*; *Polinice*; *Saul*; *Agide*; *Bruto*. He also wrote a number of satires and sonnets, and a masterly autobiography.

**Alfold**, also called Pusztas, a great plain of mid Hungary stretching from the Danube to the Carpathians. The plain is rich in fruit and pasturage.

**Alfonsine Tables**, see ALPHONSINE TABLES.

**Alfonso** (the name of 5 kings of Aragon). **Alfonso I.** (1104-34), married to the widow of Raymond of Burgundy in order to unite the 2 great Christian states against the Moors. His violent quarrels with her led to civil war. He gained the title of the Battler from his great battles with the Moors.

**Alfonso II.** (1162-96), christened Ramon, adopted this name in order to please the Aragonese. He was ruler of Aragon and ter. in S.E. France. Held Leon in the work of reconquest.

**Alfonso III.** (1285-91), a weak king who could not hold his nobles in check.

*Alfonso IV.* (1327-36), a weak king whose reign is colourless.

*Alfonso V.*, the Magnanimous (1416-1458) king of Aragon, Sicily, and Naples. A patron of men of letters and one of the conspicuous figures in the Renaissance. Had a great liking for the classics, and his court was the recognised centre for wandering scholars.

*Alfonso* (name of 11 kings of Leon and Castile). Of the first 2 kings of this name very little is known. They ruled between the years 740 and 840. To the first the title of 'the Catholic' was given; to the second, his grandson, the name 'the Chaste.' Later legend purports to tell us much more than we can gather from contemporary or reputable records.

Of the next 3 As. we are also able to gather very little, but during their period (866-1028) we get the beginning of organised resistance to the Moorish invaders, and also the beginning of an organised Aragon. Especially can this be noted of A. V. (999-1028).

*Alfonso VI.* (1065-1109), a leader of organised resistance to the Moors. He brought Spain nearer the papacy, and endeavoured, by spreading Fr. influence, to civilise Spain.

*Alfonso VII.* (1126-57), 'the king of the men of two religions.' He strove after the unity of Spain and protected the Moors. He was killed in trying to check a Moorish rising.

*Alfonso VIII.* (1158-1214), king of Castile and leader of the Christian coalition that broke the power of the Moors. He married a daughter of Henry II. of England.

*Alfonso IX.* (1188-1230), king of Leon. The only important feature of his reign is the quarrels which his marriage brought him into with the pope.

*Alfonso X.* (1252-84) 'El Sabio' (the Wise), a learned king, who gave great encouragement to the study of astronomy. His policy, however, led to frequent quarrels with his nobles, and his attempt to obtain the empire led to much severe and unpopular taxation.

*Alfonso XI.* (1312-50), the Avenger, is noted chiefly for the severe manner in which he repressed his rebellious nobles, and for the defeat of the last Moorish invasion from Africa.

*Alfonso* (name of 6 kings of Portugal).

*Alfonso I.* (1112-85) succeeded in establishing the independence of Portugal, which up to this time was a dependency of Leon. A great warrior and a man of gigantic stature, he distinguished himself in many battles against the Moors.

*Alfonso II.* (1211-23), noted chiefly for his endeavours to weaken the power of the clergy, for which he was excommunicated, and for the code of law which he introduced.

*Alfonso III.* (1248-79) His reign was taken up principally in fighting the Moors.

*Alfonso IV.* (1325-57). Wars with Castile and the Moors occupied most of his reign. Civil war broke out between himself and his son Pedro as a result of

the barbarous murder of Inez de Castro (Pedro's wife).

*Alfonso V.* (1438-81), usually called 'Africano,' a name which he gained for himself by invading the territories of the Moors in Africa.

*Alfonso VI.* (1656-67). Forced by his vices to abdicate in 1667, he retired to Terceira, where he d. in 1675.

*Alfonso XII.*, king of Spain (1875-1885) was b. Nov. 28, 1857. In 1868 he accompanied his mother into exile, and in 1870 she abdicated in his favour. While continuing his education at Sandhurst in 1874 he issued a manifesto proclaiming himself the only representative of the Sp. monarchy. In the following year he entered Spain, being received everywhere with enthusiasm. He married his cousin, the Princess Maria de las Mercedes, and on her death an Austrian princess, Maria Christina. He d. of phthisis in Nov. 1885, having shown himself in his short reign to be a tactful and fearless sovereign.

*Alfonso XIII.* (1886-1941), king of Spain, son of A. XII., b. posthumously, May 17. His mother, Queen Maria Christina, formerly an Austrian arch-duchess, acted as regent during his minority. He assumed control of the gov. in 1902. In 1906 he married Princess Victoria Eugenie of Battenberg, niece of Edward VII., and narrowly escaped assassination on the day of his marriage. An heir to the throne, named A. (Count Covadonga) was b. in May 1907 and d. in 1938. There are 3 other sons and 2 daughters. During A.'s minority, Spain lost its colonial empire as a result of war with the U.S.A. Later features were its neutrality during the First World War, and its campaign in Morocco—which created trouble at home that led to the suspension of the constitution in 1923. His assassination was attempted sev. times. In 1930-31, following the death of the dictator, Primo de Rivera, the Republican party rapidly gained in political influence until, in Apr. 1931, they carried the day at the polls. To avert the danger of civil war A. left the country, though he refused to renounce his monarchical rights. He and the royal family were allowed by the Republican Gov. to leave Spain unmolested, and A. settled in Rome. Later, he formally abdicated. Of his 4 sons, the 2 eldest, the Prince of the Asturias and the Infante Don Jaime, renounced their rights to the succession in 1933, the youngest, the Infante Don Gonzalo, was killed in a motor accident in 1934, and the third son, Don Juan, was named in 1941, by A., as successor to the Sp. crown 'when Spain judges it opportune.' See S. Erskine, *Twenty-nine Years: the Reign of King Alfonso XIII. of Spain, 1931; Don Alfonso XIII.: a Study of Monarchy*, by Princess Pilar of Bavaria and D. Chapman-Huston, 1931.

*Alford*, a vil. in Aberdeenshire where the Covenanters were defeated by Montrose, 1645.

*Alford*, a mkt. tn. 22 m. N.E. of Boston, Lincolnshire; pop. 2500.

**Alford, Dean Henry** (1810-71), Eng. divine and scholar. He showed early promise of extraordinary abilities, for at the age of 10 he had written sev. Lat. odes and a hist. of the Jews. He entered Cambridge in 1829. Shortly afterwards he issued his first vol., entitled *Poems and Poetical Fragments. The School of the Heart and other Poems* followed. His great work, his *Greek Testament* in 4 vols., was pub. between 1849 and 1861. In 1841 he became vicar of Wymeswold in Leicestershire. His scholarly and erudite *Chapters on the Greek Poets* now appeared. In 1857 he was ordained dean of Canterbury. Among the many hymns he wrote is 'Come, ye thankful people, come.'

**Alford**, see MAISONS-ALFORT.

**Alfraganus, or Al-farghani**, an Arabian astronomer who fl. in the early part of the ninth century. He was the first among the Arabian astronomers to enumerate the small stellar groups, and he wrote a treatise on the elements of astronomy.

**Alfred the Great** (871-900) was b. at Wantage, in Berkshire: the exact date of his birth is not known, and authorities differ between the years 843 and 849. The generally accepted date, however, is the year 849. In 853 and in 855 he was taken to Rome, where, on his first pilgrimage, he was hallowed by the pope, Leo IV. Even prior to his accession to the throne he was in continual conflict with the Danes, and he assisted his brother Ethelred right down to his death. He was the youngest son of Ethelwulf, and succeeded on the death of his elder brother. The first few years of his reign were constantly occupied in fighting the Danes under their great leader Guthrun. For 7 years A. fought, bargained, and treated with the Danes in a vain endeavour to give the wearied country a rest from the constant war and bloodshed which she had endured. In 878 A. was driven into the woods and swamps of Somerset, and remained in hiding at Athelney until he found himself strong enough to burst forth upon the Danes. At the battle of Edington in Wiltshire in 878, he utterly defeated the Dan. invaders after an obstinate and prolonged struggle, driving them back to their fortifications at Chippenham. A short siege followed, at the end of which the treaty usually known as the treaty of Wedmore was signed, 878. The Danes became Christians, the country was divided up, N. and E. of a line drawn roughly from Chester to London became the Danelagh, S. and W. remained Wessex. The victory at Edington arrested the flowing tide of Dan. conquest and brought nearer a united England. For the greater part of the rest of his reign A. was able to attend to the crying needs of the country. The army was reorganised, a navy recognised as an absolute necessity, justice was reformed, education received attention. By means of his navy A. was able to attack the Danes on the sea and in their strongholds, but this policy of a strong

navy was not followed closely enough by his successors. To his court A. invited learned men from all parts of Europe, men whose learning would be of use to him in his great scheme for the education of the people of England. Chief amongst these men we may mention Asser, Werfrith, and Plegmund. From his reign dates the beginning of Eng. prose writings, to which he by his own toil and the work of his school added not a little. The epitome of Orosius, the *Consolation of Boethius*, the *Pastoral Care* of Gregory, and Bede's *Ecclesiastical History* are all translations by A. himself. He issued also a code of laws, compiled on the lines of the code of Ina and Offa. The latter part of his reign was again taken up in fighting the Danes under Hasten, and desultory fighting seems to have taken place right up to his death in the year 900. See Stubbs, *Alfred the Great*, 1901.

**Alfred**: 1. a vil. in Alleghany co., New York, U.S.A. On Pine Hill is A. Univ., associated with which is the New York State School of Clay-working and Ceramics. There is now also a State School of Agriculture in connection with the univ. 2. A co. of S. Australia on the E. border, bounded on the N. by the Murray R.

**Alfred of Beverley**, see ALURED.

**Alfred Ernest Albert**, duke of Saxe-Coburg and Gotha, and duke of Edinburgh (1844-1900), was the second son of Queen Victoria. On the deposition of Otho he was unanimously invited by the Gks. to become their king, but political difficulties of long standing rendered it impossible. Was rear-admiral in 1878, and commander-in-chief at Devonport (1890-93). He succeeded to the duchy of Saxe-Coburg and Gotha in 1893.

**Alfreton**, a tn. in Derbyshire noted as a mkt. centre. It is 14 m. from Derby. The chief industry is coal mining, but there are hosiery factories, and earthenware is manufactured. Pop. 21,000

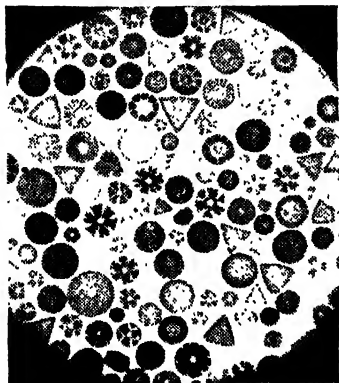
**Alfura Sea**, see ARAFURA.

**Alfuras, or Harafuras**, the aboriginal inhab. of Celebes, but inhabiting also Buru, Ceram and New Guinea, and said to be of Malay extraction.

**Algæ** (Lat. *alga*, seaweed), with the fungi, form the large group of the vegetable kingdom known as the Thallophyta; they have many characteristics in common, and the lichens are a curious link between them, as they are partly algal and partly fungoid in construction. While, however, A. possess chlorophyll—sometimes masked by other colours—the fungi are devoid of this pigment. Both A. and fungi have as their body a *thallus* (hence *Thallophyta*), which is always a comparatively simple structure, never differentiated into root, stem, and leaves. According to the colouring matter they contain, the A. are divided into green A. or Chlorophyceæ, brown A. or Phæophyceæ, red A. or Rhodophyceæ (sometimes Floridæ), blue-green A. or Cyanophyceæ, and Diatoms (Diatomaceæ), yellowish brown in colour.

Plants in this group reproduce either sexually or asexually, in the latter case frequently by means of ciliated spores which are able to move in the water. In the sexual reproduction the gametes sometimes unite in isogamous conjugation, i.e., with similar gametes; but others have heterogamous conjugation, when a male unites with a female gamete to form the new plant.

The *Pleurococcus* is a well-known green alga which occurs as a unicellular plant on damp wood. It multiplies by cell-division, and often many cells will be found together; it also reproduces by biciliate spores and isogamously. *Spirogyra* is usually found in slimy masses in ponds and lakes, each plant consisting



GROUP OF DIATOMS

of sev. cells united to form a filament, each cell being complete in itself and the filament having no attachment and showing no distinction of base and apex. Such a filamentous alga was said, in the time of Linnaeus, to belong to the genus *Confervae*, or jointed A., but this is too wide a name for present-day discoveries. The *Spirogyra* conjugates in an isogamous manner; 2 neighbouring filaments send out processes from their cells which fuse on meeting, and form a tube through which the contents of one cell, contracted into a gamete, pass over into the other cell and there unite with a similar gamete. The *Edogonium* is a filamentous green alga which grows attached to stones in ponds. It reproduces by means of a multiciliate spore which moves in the water and finally attaches itself to a stone and forms another filament, or it reproduces sexually by means of an oogonium and antheridium. These 2 sexual organs may occur on the same filament, or one kind may be peculiar to a single filament. The antheridium, which is formed by cell-division, produces 2 spermatozooids

which have a large nucleus and many cilia. The oogonium forms a rounded protoplasmic ovum, and the spermatozoid swims down a passage to the ovum; the resulting oospore gives rise usually to 4 zoospores with cilia, and these break free, swim about, and finally form a new plant.

From the 3 examples of the Chlorophyceae given above it will be seen that the green A. vary greatly both in structure and as regards their reproductive processes. Other well-known types, such as the *Ulothrix* found in running water, the *Faucheria* common to damp earth and the soil of potted ferns and other plants, and the *Chlamydomonas* found in ditches and ponds, show different structures again. The Phaeophyceae and Rhodophyceae consist nearly entirely of seaweeds (q.v.), and the Cyanophyceae are regarded as doubtful A.

The *Cyanophyceae* consist of very simple plants growing in both fresh and sea water. Neither nucleus nor sexual reproduction has been observed in connection with them. They reproduce by means of spores or by div. of a filament at a cell called a *heterocyst*, i.e. a large cell which contains food material.

The Diatoms are most important constituents of the plankton, i.e. the surface life of both fresh and salt water, where they form the final link in the food chains of fish. Diatoms are remarkable in possessing a siliceous external skeleton, often beautifully ornamented, and composed of 2 halves, which fit together like a lid on a pill box. The fossilised skeletons form deposits of kieselguhr, which is used as an absorbent in the manuf. of dynamite. See D. H. Scott or F. T. Brooks, *Structural Botany*, part II., 1932; F. Wille, *Freshwater Algae*, 1887; F. Oltmanns, *Morphologie und Biologie der Algen*, 1904-5, 1922-23; C. S. West and F. E. Fritsch, *British Freshwater Algae*, 1927; F. E. Fritsch, *Structure and Reproduction of the Algae*, 1935-45.

**Algardi, Alessandro** (1602-51), an It. sculptor and architect, was a pupil of Giulio Cesare Conventi. He first worked in Mantua, but afterwards went to Rome, where he executed 2 statues in stucco for the Capella Bonaiuti in the church of San Silvestro. His prin. works are: the colossal group in marble, representing the decapitation of Saint Paul, for the church of the Padri Bernabiti at Bologna; the monument of Leo XI., and 'Attila checked by Saint Leo,' in St. Peter's; and the bronze statue of Innocent X.

**Algaroba, or Algarroba** (from Arabic *al*, the, and *kharrub*, carob-tree, or *Algarrobo*, a tn. in Andalusia), the carob-tree, *Ceratonia siliqua* (q.v.) and bean; also certain S. Amer. species of *Prosopis*, of the sub-order Mimoseae. known as the mesquite-tree.

**Algarotti, Francesco, Count** (1712-64), an It. philosopher and writer on art. He was educated at Rome and Bologna. He became acquainted with Voltaire in Paris, and the relationship assumed a long friendship. He now produced in

*Parla Newtonianismo per le donne*, a work on optics. In 1740 he was made a count of Prussia by Frederick the Great.

**Algarve**, the smallest and most southerly prov. of Portugal. Till 1253 it was in the possession of the Moors. Its area is 1937 sq. m.; its pop. 295,000. Fruit and wine are abundantly produced. The chief industries of the people are fishing and salt-making. Faro is the chief tn.

**Algebra**, a system of mathematical calculations where quantities are designated by symbols, usually letters of the alphabet. In ordinary A. the same operations are carried on as in arithmetic, but the symbols being capable of a more generalised and extended meaning than the figures used in arithmetic, it facilitates calculation where the numerical values are not known, or are inconveniently large or small, or where it is desirable to keep them in an analysed form. Addition is denoted by + and subtraction by -;  $a + b$  and  $a - b$  therefore indicate the addition and subtraction respectively of the quantities represented by  $a$  and  $b$ . The results may enter into subsequent calculations as  $(a + b)$  and  $(a - b)$ . Multiplication is denoted by  $\times$ , or by putting the symbols together, thus  $a \times b = ab$ ; division is denoted by  $\div$  or the use of the frac-

tional form, thus  $a \div b = \frac{a}{b}$ . Involution, or the multiplication of the same quantity, is shown by the use of small numbers, or indices; thus  $aaaa = a^4$ .

Therefore  $a^4 \times a^2 = a^6$ ;  $a^3 \div a^2 = \frac{1}{a}$  or  $a^{-1}$ .

Evolution is denoted by the use of radical signs or of fractional indices; thus the seventh root of  $a = \sqrt[7]{a}$  or  $a^{\frac{1}{7}}$ .

Negative quantities commonly enter into algebraic calculation. Thus if the value of a symbol be represented by the distance in a given direction of a point from a fixed point, the corresponding negative symbol represents an equal extension in the opposite direction. Unreal quantities, such as the square root of a negative quantity, can also be symbolised and used in A.

A. was probably known in a rudimentary form to the anc. Egyptians, but the earliest western work on the subject was written by Diophantus of Alexandria about A.D. 350. The Hindus had developed A., however, to a point far beyond the achievements of Diophantus. From them the Arabs brought the system to the W., and Mohammed ben Musa, c. A.D. 820, wrote a work entitled *Al-jabr wa'l-muqābala*, from which the word 'algebra' has been derived. In 1202, an It. merchant, Leonardo of Pisa, reintroduced the study of A. into Europe, where it had declined since the fall of the Rom. empire. The solution of cubic equations and bi-quadratic equations was accomplished by the sixteenth century, and in the seventeenth Franciscus Vieta used symbols for known quantities as well as unknown, and introduced such terms as *affirmative*,

*negative*, and *coefficient*. Descartes, the famous Fr. philosopher, connected A. with geometry in 1637, and did much to extend the theory of equations. The discovery of logarithms by Napier and of the calculus by Newton and Leibniz, and the development of differential equations by Gauss and Riemann prepared the way for Einstein's theory of relativity, and for a modern higher A. which has proved to be the tool and to some extent the inspiration of recent research in the fields of atomic energy and radio.

**Algeciras**, a Sp. tn. in the prov. of Cadiz, situated on the bay of Gibraltar. Charcoal and tanned leather are extensively produced. The tn. is noted for its oranges and bullfights, but is chiefly memorable for the conference of the powers held there in 1906. This arose out of the unsettled state of Morocco, due to the deposition of Abd-el-Aziz by his brother, Mulai Hafid, who succeeded him as sultan. In the agreement of Algeciras, signed on Apr. 7, the powers entrusted France and Spain with the duty of creating a gendarmerie and pacifying the country. The Agadir incident, which during 1911 taxed the resources of European diplomacy, arose from what was alleged to be a practical repudiation by Germany of the Algeciras agreement. In the Sp. Civil war, 1936-39, it was bombarded by republican war-ships, Aug. 1936. Pop. about 13,000.

**Alger**, Russell Alexander (1836-1907), Amer. soldier and politician, b. in Medina co., Ohio. At the outbreak of the Civil war he enlisted in a cavalry regiment and was distinguished in the Gettysburg campaign. He was secretary of war under McKinley, and was criticised for extravagance; he replied in his book, *The Spanish-American War* (1901). Was elected senator 1903.

**Algeria**, a country of N. Africa and a Fr. possession. It lies between  $4^{\circ} 36'$  W. to  $6^{\circ} 16'$  E. long.;  $37^{\circ} 6'$  N. to an undefined S. limit, about  $30^{\circ}$  N. Its boundaries are, on the N. the Mediterranean, on the W. Morocco, on the S. the Sahara, and on the E. Tunis. The former political divs. of the country were three, Oran on the W., Algiers in the centre, and Constantine in the E. but the colony of A. is now organised in 2 great divs., N. A., 80,000 sq. m. in area, and S. A., 142,000 sq. m. N. A. comprises the Civil Ter. and the Territoire de Commandement, but the latter is rapidly becoming merged in the former. It contains 17 arrons., 276 coms., and 76 mixed coms. in the Civil Ter. and 2 mixed coms. in the military ter. In S. A. are the 4 ters. of Ain-Sefra, Ghardaia, Tuggurt, and the Sahara oases, organised under a decree of 1905. By a law passed in 1919 the status of Fr. citizens was given to natives over 25 years of age and monogamous, who are farmers or property owners, or who are not illiterate or who served in the First World War. The 3 depts. of A.—Oran, Algiers, and Constantine—form an integral part of France, under a governor-general.

The physical features of A. divide

the country into 3 divs., viz. in the N. the Tell, consisting of mt. masses divided here and there by deep and fertile valleys; in the middle a region of steppes, a mountainous table-land broken at intervals by brackish lakes, called shotts; in the S. is the Algerian Sahara. The Tell contains the following mt. chains, collectively called the Coast Mts., but separately comprising the Blidah, Jurjura, and Little Khedija. Parallel to these are the Middle Atlas Mts. The Tell is the most populous region and is on the average 47 m. broad. The steppe, or middle region, possesses the largest streams, which empty themselves in the Mediterranean, through gaps in the Coast Mts. They are of no available value, being choked and considerably diminished in size during the summer. In irrigation, however, they are of more value.

The climate of A. is generally warm, though the varying altitudes cause a wide range of temp. The coast enjoys a very mild climate. The rainy season is prolonged over a period extending from Dec. to Mar. From May to Oct. a hot, dry climate is experienced, rendered very extreme by the *sirocco*, a wind that proves a great affliction, both on account of its great heat and of the fine sand it carries. During the day the temp. is very different from that felt at night. Generally the climate is healthy, and many improvements in the shape of irrigation, the draining of Lake Hallula, and the planting of forests conduce to more salubrious conditions than naturally would be found.

Agriculture is an important activity and there are sev. agric. banks supported partly by gov. funds. The greater part of the State lands have now been appropriated to colonists, the chief crops raised being wheat, especially in Tell, and most of the ordinary cereals and root crops. In the centre of the country, or the old prov. of Algiers, fruit and vegetables are cultivated extensively, and tobacco, flax, and cotton are also important products. Sericulture, which is subsidised by the Gov., is in an experimental stage. The chief fruits are orange, lemon, date, banana, almond, olive, fig, pomegranate, and all are grown in abundance, largely on account of the boring of artesian wells, which has made it easy for fruit-bearing trees to flourish. The grape is also cultivated, and the wine yield is now nearly 300,000,000 gallons a year. There is a fair amount of timber from the state forests for industrial purposes. These forests contain pine, oak, cedar, pistachio, carob, olive, and myrtle trees. The exports consist mainly of wine, wheat and other cereals, sheep and oxen, skins, fruits, phosphates, cork wood, asparto grass, iron and zinc ores. In the steppes inexhaustible supplies of alfalfa are grown. Iron, copper, zinc, quicksilver, and lead mines are worked.

The pop. is (1936) 7,235,000, of whom 987,000 were Europeans and 6,248,000 natives. Of the native inhab. the chief

are Arabs and Berbers, the former being found chiefly in the S., while the latter inhabit the dist. of Tell. A number of Moors, though not pure, are found on the coast. In the tns. negroes, originally slaves, fill the menial positions of labourers and servants. The natives are entirely Moslem, but Islam is found in its purity only among the Arabs. The Jews have for the past decade or more been regarded as Fr. citizens, and their rabbis, like the Protestant pastors, receive



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AN ARAB CAID, ALGERIA

gov. grants. The Rom. Catholic Church has an archbishop and 2 bishops. There is a univ. at Algiers attended by some 2000 students, and, besides the usual faculties, there are special schools for the fine arts, commerce, and agriculture. Some 50,000 native children attend the 550 Moslem schools, and there are also higher Moslem schools in the 3 chief tns., besides a system of primary and secondary schools. Before the Second World War the military force in A. and Tunis comprised the 19th Army area of 3 divs. Both Fr. residents and natives were obliged to serve; and the troops might be stationed in N. Africa or sent on colonial expeditions, but they belonged to the 'Metropolitan,' and not to the 'Colonial' Army. The strength of the army in A. and Tunis in 1938 was approximately 71,000, but, in 1939, in consequence of It. policy respecting Tunis, it was greatly increased.

Animal life in A. contains, among domestic animals, camels and sheep,

horses and mules. Sheep form the chief wealth of the Arabs. Wild animals are leopards, few, however, in number, jackals, hyenas, Algerian apes, boars, brown bears, and the red deer. periodic visits of locusts are responsible for great damage.

Algiers (pop. 264,000) is the cap. and prin. port. Oran (195,000) is the cap. of the dist. of that name, and a flourishing seaport. The inland cap. of Constantine (107,000) is a tn. of the same name. Other ports are: Bona (83,000), Philippeville (65,000), Blidah (40,000), Bougie (31,000). The inland tns. are: Tlemçen (52,000), Sidi-bel-Abbes (51,000), Mostaganem (37,000), Sétif (36,000), Mascara (32,000), and Biskra (8000), El Wad, Tuggurt, and Wargla. Commerce is confined to Fr. vessels. There is a large coasting trade. The chief exports are those of oxen, sheep, and horses. In 1939 there were 3000 m. of railroad open for traffic. Communication exists by rail between the frontiers of Morocco and Tunis, and between Algiers, Oran, and Constantine by branch lines, in the same system being many of the smaller tns. There is a regular air service between Oran and Morocco, and between Oran and Alicante in Spain.

From 1876, A., formerly under military despotism, became governed by a civil governor-general. The post was ornamental till 1900, when direct authority over customs and smaller matters was vested in his person. To-day all the services are under his administration, with the exception of those of the Treasury, Education, Justice, and Worship, which are under their respective ministries in Paris. The budget, which is prepared by the governor-general, is entirely separate from the Fr. national budget. The governor-general is assisted by a consultative council of 15 official members and a superior council of 60 members. A. sends 3 senators and 10 deputies to Paris. The whole legislation is conducted in the Fr. chambers, but such subjects as are not within this power are regulated by decree of the president of the republic.

*History.*—In early times the inhab. of A. comprised the Numidians in the E., and the Moors in the W. Under the Romans the cities of the W. formed practically colonies of Rome. About A.D. 440 the Vandals conquered A., and relapse into a condition of barbarity followed. Social advancement found impetus in the immigration of the Muslims. Algiers was built c. 935 by an Arab prince named Zelri, whose family held control of A. till 1148. The Almohades then took possession of it. In 1269 it was broken up into a number of small ters. There settled in A. in 1492 the Moors and Jews who had been expelled from Spain. In order to seek revenge, piracy was adopted and extensively followed. The Sp. monarch Ferdinand punished them by taking Algiers in 1509. At this time a prince of A. sought the aid of a famous Turkish pirate named Horuk Barbarossa. At

this point Turkish power in A. may be said to have begun, for, with the treachery necessary to his trade, Barbarossa slew the amir whom he had come to help, and massacring his followers, estab. himself sultan of A. A period of success attended him, but finally he was taken and beheaded. The monarchy was then given to his brother, who, under the protection of the Ottoman court, and with the aid of a Turkish army, drove out the Spaniards, installed a military absolutism and piracy. Various expeditions, under the Eng., Dutch, Fr., Spaniards, and Amers. successively, failed to check piracy till 1830, when Algiers was bombarded into submission by a Fr. fleet. Gen. Clausel now endeavoured to establish order. A fierce and intrepid opponent rose in the person of Abd-el-Kader, who organised a holy war to such advantage that the Fr. general was forced to send for reinforcements. Clausel's successor, Gen. Lamaremont, severely punished the Kabyles, a branch of the Berbers, and a different state of things now prevailed. Constantine was subdued and a governor-general appointed. In 1847 Abd-el-Kader surrendered. A series of insurrections of the Kabyles gave the Fr. considerable trouble, but order was ultimately restored. During the Franco-Prussian war it became necessary to withdraw most of the troops from A., and the opportunity was seized to revolt against the military despotism then in vogue. Since 1883, however, order has been preserved and the natives have maintained a friendly attitude. The hist. of A. has in every sphere been a chequered one and neither general success nor failure can be spoken of. France's Algerian problem has always been complicated by the fact that A. was distinguished from every other Fr. colony in that it has been looked on as 'the prolongation of France' and as a sort of training ground or experimental station for Fr. colonisation elsewhere. The actual success or failure of A. as a detailed experiment in colonisation is insignificant in comparison with the wider influences which the country has exercised on France and the other Fr. colonies in shaping policy. As regards general development, A. has led all the other Fr. colonies in obtaining economic enfranchisement; but this has been offset by the fact of the proximity of the motherland, with consequential control in all branches of economic activity.

On Nov. 8, 1912, a great expeditionary force from Great Britain and U.S.A., under the supreme command of Gen. Eisenhower (q.v.), landed at various ports in A. (and Fr. Morocco). The cease fire was sounded by the Fr. under orders from Adm. Darlan (q.v.) on Nov. 11. Darlan was assassinated soon afterwards. See also *under AFRICA, NORTH, SECOND WORLD WAR, CAMPAIGNS IN.*

Consult S. H. Roberts, *History of French Colonial Policy (1870-1925)*, 2 vols., 1929; C. Southwirth, *The French Colonial Venture*, 1931; also W.



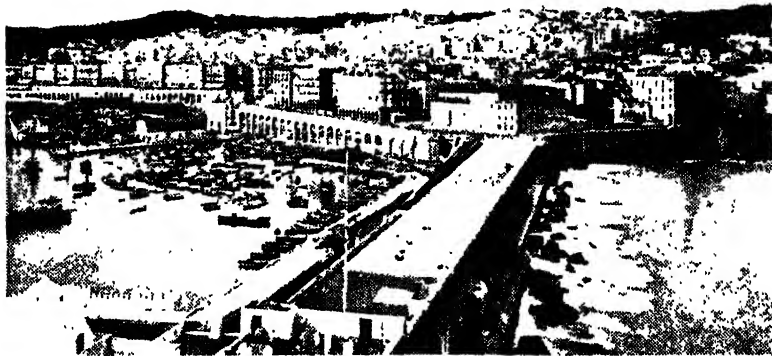
Sloane, *Greater France in Africa*, 1924 (descriptive); and W. B. Worsfold, *France in Tunis and Algeria* (descriptive) 1930.

**Alghero**, a seaport on the W. coast of Sardinia. Coral diving and fishing form its chief industries. A convict settlement is estab. there. Pop. (1901) 10,779.

**Algiers** (Fr. *Alger*), the cap. of Algeria. The name is derived from *Al-jezair*, an Arabic word meaning islands. To form a harbour, which after heavy expense provides good accommodation, 4 is. were joined together. A. is situated on the slopes of a hill at the summit of which is

is Port Elizabeth, the W. arm ends in Cape Recife.

**Algol**, or **Beta Persei**, a star of second magnitude. It is the best-known variable star, changing from magnitude 2.3 to 3.5 during a period of 68 hours 49 minutes owing to being eclipsed by a dark companion star. Vogel estimated that A. is 1.2 times the size of the sun, and its dark companion about the same size as the sun, and concludes that the distance between their 2 centres is 3,200,000 m. A. has a helium spectrum, and though Al-Sufi classified it as a red star in the tenth century, it is now a brilliant white.



ALGIERS, FROM THE MARINA

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a fortress called the Kasbah, which belonged in former days to the beys. The city consists of 2 parts, 1 of which is old, while the other is a marked contrast by reason of its modernity. The modern tn. possesses many splendid streets, and the general air is quite European. The public buildings of most importance are the Kasbah, the gov. offices, the palaces of the governor-general and archbishop, the Rom. Catholic cathedral, and the church of the Holy Trinity (the Eng. church). The tn. was founded in the tenth century, and from 1530, when the Turkish pirate Kheir-ed-Din expelled the Spaniards, until its conquest by France in 1830 it was a nest of piracy, exacting tribute from all the maritime nations. It is third in importance among Fr. seaports and a coaling station, and distributes the grain, esparto grass, wines, oil, etc., of Central Algeria. Sheltered from every wind, it is a favourite winter resort. In 1937 the pop. was 264,000, comprising a medley of all nationalities, the Europeans numbering 182,000.

**Algoa Bay**, a broad inlet of E. S. Africa. Bartholomew Diaz made it his second landing-place. In the S.W. angle

**Algoma**, an extensive dist. in the prov. of Ontario in the dominion of Canada on the N. shore of Lake Huron. The ter. has great mineral wealth, being rich in silver and copper. The Canadian Pacific railway passes through the dist.

**Algonkian**: 1. System, a geological term used to denote a stratum of rocks that overlies the basal system, and is succeeded by the series of the Palæozoic system. In the region of Lake Superior these rocks, consisting of quartz, limestone, sandstone, etc., contain very valuable iron and copper deposits. 2. Stock, a group of N. Amer. Indians embracing more tribes than any other group. In the group originally there were various tribal confederacies, though no real union of the tribes of the entire group existed. The A. tribes were the first N. Amer. Indians to come in contact with the Eng.

**Algonkin**, or **Algonquin**, a branch of the Algonkian family of Indians. The term was once applied to the Weskarini, a small tribe of the Ottawa valley, but later included the Nipissing and others. In the seventeenth century they were driven out of the St. Lawrence region by the Iroquois; some fled to Michigan, others

to the N.E., but returned. They are said to have numbered 4000 at the coming of the white man; to-day there are about 2000, mostly of mixed blood, restricted to reserves in E. Ontario and W. Quebec.

**Alguazil**, a Sp. title conferred upon judges in former times. The pure function of it has been lost, however, and any officer connected with the execution of justice bears the name. See A. R. Le Sage, *The Adventures of Gil Blas* and G. Borrow, *The Bible in Spain*.

**Alhakim I.**, emir of Cordova (796-822), drove the Franks beyond the Pyrenees. A. II., caliph of Cordova (961-976), won many victories over the Christians, and extended the influence of the Muslim creed.

**Al-Hakim-ibn-Otto**, fl. c. 760, an impostor who came as a prophet to Meshed the cap. of Khorassan. He always uttered his prophecies from under a veil, and was called Al Mokanna—the Veiled One. Moore has immortalised him in his poem *Mokanna, or the Veiled Prophet of Khorassan*.

**Alhama**, a tn. of S. Spain in the region of Granada. It derives its name from the baths which form to-day one of its few remaining monuments of antiquity. Byron trans. a ballad which describes the fall of the tn. entitled *Ay de mi, Alhama*. Pop. 4900.

**Alhambra**, an anc. fortress and palace of the Moorish monarchs of Granada. The name is derived from *Kal'at-al-hamra*, meaning the red castle, because of the colour of the bricks of which the walls were composed. It is surrounded by a massive wall, strengthened here and there by lofty towers. Of these, that called the Hall of the Ambassadors is the most famous. It was built during the years between 1218 and 1351, and although most of the artists are unknown, the painting of the interior has been traced to Yusuf I. The building is situated in a position of rare natural beauty. The most striking feature is a park of Eng. elms, brought there by Wellington in 1812. Scattered over most of the buildings is a species of lace-work which, when closely observed, bears, intricately worked into its design, transcriptions from the Koran, besides specimens of Arabic poetry. See Calvert's *Granada Present and Bygone*, 1908.

**Alhambra**, tn. in Los Angeles co., California, U.S.A. It stands at the entrance to the San Gabriel Valley and is virtually a residential suburb of Los Angeles. Near its tn. limits are the remains of the famous San Gabriel Mission founded in 1771. Pop. 30,000.

**Alhassan Ibn Mohammed Alwazzan**, see LEO AFRICANUS.

**Alhazen**, an Arabian mathematician of the eleventh century. He was b. at Basra, and d. in Cairo in 1038. In order to avoid a task the ease of which he had boasted to the caliph Hakim, he feigned madness till that monarch's death. He had a great reputation as an authority upon optics.

**Alhucemas**, a settlement on the bay

of that name, comprising 6 is., belonging to Sp. Morocco. Pop. 370.

**Ali, or Ali-ben-Abu-Talib** (600-61). the fourth of Mohammed's successors. Born at Mecca in 600, he married his cousin Fatima, daughter of Mohammed. In 650 he was made caliph. The young widow of Mohammed, however, rebelled, but the insurrection was crushed. In 661 A. was assassinated. His rule is noticeable in that 2 parties were formed in the state, a result which arose from the different supporters of the struggling parties in the rebellion. They were Shiites and Sunnites respectively. A. is looked upon as having possessed a reputation for wisdom. A. had by Fatima 3 sons, Hassan, Hussein, and Mohsen. Hassan succeeded his father for a short time in the gov., and with him terminated, according to the Arabic historians, the legitimate caliphate, i.e. the succession of those caliphs who had been appointed by the free choice of the faithful.

**Ali, Hyder**, see HAYDAR ALI.

**Ali Pasha** (1741-1822), the Lion, was b. in Albania. The early death of his father affected his mother so much that she became imbued with one idea, namely vengeance. To this idea her son was constantly educated. He showed very shortly that many of the wild impulses in his mother's temperament were inherited, for he murdered his brother in order to ensure his own position, and later, upon a charge of poisoning, killed his mother. He helped the Turks during the Austro-Russian war. A career of cool impudence, deliberate betrayal, and high daring ended in his being killed by Sultan Mahmud. He certainly extirpated the robbers and other criminals and rendered his country secure from all depredations but his own. He was a Muslim only by name: but he fully protected the Gks. and other Christians in the exercise of their religion, and allowed them to have schools and even a lyceum and library. He treated all nationalities alike: the Turks liked him least because he would not allow them to ill-use the rest of the people.

**Alias**, a name given to a second writ when the previous one has been impossible to deliver or failed in effect. The term, however, has been corrupted, and applies now to false names used by criminals.

**Alibi** (Lat. *alibi*, elsewhere), the plea of a person who, charged with a crime, alleges that he was elsewhere when the crime was committed, and thus could not be guilty.

**Alicante**: 1. A prov. in S.E. Spain, formed in 1833 of dists. of provs. of Valencia and Murcia. The surface is very diversified and the climate is temperate. Cereals are largely grown and great attention is given to rearing of silk-worms. In the Sp. Civil war, 1936-39, A. was raided by insurgent aeroplanes on May 25, 1938, 240 persons being killed and over 1000 injured. Area, 2096 sq. m. Pop. 553,700. 2. The cap. of the prov. of that name, and one of the chief seaports of the country. Popular

health resort, and is an episcopal see. Pop. 73,600.

**Alicata**, called 'l'Amata' (the Beloved), is a fortified tn. on the S. coast of Sicily, and does a considerable trade. Here Regulus defeated the Carthaginians at the naval battle of Ecnomus, 256 B.C. It was sacked by the Turks, 1543. Pop. 22,000.

**Alice**, a tn. in Cape Colony, near Fort Beaufort. Situated in its vicinity is the mission station of Lovedale.

**Alice Maud Mary, Grand Duchess of Hesse** (1843-78), the second daughter of Queen Victoria. As a child she was fond of all manner of sports, and her childhood passed without any prominent incidents. In 1862 she married Prince Louis of Hesse, who succeeded his father as Grand Duke Louis IV. in 1877. During the short illness of her father the princess nursed him with the greatest care, and after his death devoted herself to consoling her mother. Her letters, ed. by Dr. Sell, give a delightful impression of her as mother, daughter, and wife.

**Alice Springs**, a telegraph station, N. Ter., Australia, 994 m. from Adelaide, S. Australia, in 23° 38' S. lat., 133° 37' E. long. It is the terminus of the Port Augusta-Alice Springs railway (598 m.), a railway controlled by the Commonwealth Gov.

**Alicudi**, see LIPARI ISLANDS.

**Alien** (Lat. *alienus*, foreign), one who, resident in one state, is by birth or naturalisation the subject of another. The privileges and disabilities of As. in England have long been the subject of many statutes, one of the earliest being that passed in the reign of Edward III. The law as it at present stands is based on 2 Acts, the first, the Naturalisation Act 1870 (33 Vict. c. 11), and the second, the Aliens Act 1905, regulating the immigration of As. The former Act revised the whole legislation concerning As., removing many disabilities. Formerly an A. could not hold land even on leasehold tenure (if we except the special Scottish statutes of 1553 and 1607 granting this privilege to Fr. and Eng. subjects respectively), but the Act of 1870 removed this disqualification. An A. is, however, precluded from voting for, or becoming a member of, Parliament or a municipal body unless he has been naturalised, in which case, of course, he ceases to be an A. Neither can an A. own or hold any interest in a Brit. ship, but with this exception he may own, acquire, and dispose of all manner of real or personal property in the same way as a natural-born Brit. subject. On the other hand, the former privilege of an A. of being tried by a jury *de medietate linguae*, i.e. a jury in criminal proceedings of which one-half are foreigners, has been abolished, but he can sit on a jury after 10 years' domicile in England or Wales. Five years' residence in the United Kingdom is necessary to qualify for naturalisation (*q.v.*). On obtaining his (or her) certificate of naturalisation he becomes a natural-born Brit. subject, except that, unless there exists a treaty or law to

the contrary, he may if he returns to his former country still be regarded by the laws of that country as its subject. The son and grandson of an Eng. father, even if born abroad, are Eng. subjects. This is not affected even if the mothers were foreigners. The children of Eng. women by As. are As. unless born in this country, but a woman no longer becomes an A. merely by reason of marrying a foreigner unless she acquires the nationality of her husband. This is the effect of the Nationality and Status of Aliens Act, 1933, which was passed in conformity with the policy declared at the League of Nations Assembly, 1931, by the National Gov. in favour of removing all disabilities of married women in the matter of nationality; and uniform legislation on the point has now been passed by all the dominion Govs. It is to be noted that, where a certificate of naturalisation is granted to an A., his wife, if not already a Brit. subject, will not be regarded as having acquired Brit. nationality unless she actually declares within 12 months, her desire to possess that status. A foreign woman, on marrying a Brit. subject, becomes herself a Brit. subject.

Although the number of As. in the United Kingdom is very small, being but 2 per cent of the pop., and smaller than in any European country except Spain, it has been thought advisable from time to time to restrict the influx of As. In 1792-93 Lord Granville's ministry carried the Alien Acts enabling the Crown to deport the A. subjects of states at war with England, the Act at that time being directed against France in particular. The Alien Act 1905 aimed at excluding from landing in this country persons suffering from incurable disease, feeble-minded persons or lunatics, criminals, and persons so poor as likely to become a charge on the rates. In keeping with the traditional attitude of this country towards the right of asylum, the immigrant who can prove that he is fleeing his country to avoid religious or political persecution is exempted from the clause relating to lack of means, and, in 1938-39 numerous Jewish, Austrian, and Czech refugees were given temporary or permanent asylum in England and the dominions. The Act defines an immigrant ship as one carrying more than 20 A. steerage passengers. Such a ship can only discharge her human freight at ports where immigrant officers are stationed. Any immigrant rejected by the immigrant officer at the port of debarkation can appeal to a board appointed by the home secretary. The home secretary is empowered to expel from the country any A. convicted of a criminal offence whom the judge recommends for deportation, but the judge has no such power. This was exemplified in the case of the notorious anarchist Malat-ta, 1912, whom the home secretary refused to expel although a recommendation to this effect was made by the common serjeant, who tried him.

Under the **Aliens Order** (made under

the Aliens Restriction Acts 1914, 1919) any A. coming from outside the United Kingdom must obtain the leave of an immigration officer to land in the United Kingdom. This leave is refused in various cases, e.g. where the A. has no means of subsistence, or, though seeking work, cannot produce a permit issued by the Ministry of Labour. Resident As. must be registered, and deportations on certain grounds can be ordered by the Home Office, e.g. in the case of an A. convicted of felony or living in insanitary conditions. These restrictions are provided for in the Aliens Restriction Act 1914, as amended by the Act of 1919. The Act of 1914 was essentially a wartime measure, but the effect of the Amending Act of 1919 is to make its provisions, as amended, virtually perpetual. Where expulsion is ordered, the secretary of state must pay the whole or part of the A.'s expenses of deportation, including the maintenance of the A. and of any dependants he may have with him.

An aspect of the A. question which has, for many years, been of political importance, is the attempt of countries peopled by European stocks to keep out yellow and other coloured persons. Especially is this the case in the U.S.A. and the dominions of Australia and S. Africa; Australia carrying it to the length of putting a poll-tax of £100 on coloured immigrants. Australia, Canada, and the U.S.A. prohibit the immigration of contract labour. Under various Acts, the quota of A. immigrants into these countries, and into S. Africa, is in a fixed ratio of A.-S. to S. European persons. The present table of quotas for intending immigrants into the U.S.A. was introduced in July 1929. It changed the old basis of calculation entirely, and reverted to a calculation based on an estimate of the racial divs. when the U.S.A. became a nation, or, in other words, the Act went back to the ancestors in the census of 1790. Previously to 1929 a percentage of the nationals of the 1890 census was taken as the quota. The new quota reflected an important change of policy, which was designed to keep out all As. save a quota loaded in favour of the Nordic countries, and the motive of the new policy was the fear that 'Old America,' mainly A.-S., was being overwhelmed with other nationals. Probably 70 per cent of the U.S.A. pop. have Brit. blood in their veins, and the present quota gives a preference to the solely Brit. Only the consular officials of the State Dept. have power to issue the essential passport visas. The status of As. in the U.S.A. is determined principally by state laws, though these have to be congruent with Federal treaties with foreign powers. An A. does not possess political rights, nor is he subject to the political duties of a citizen, yet may be required to serve in the militia or police of the state. The laws of the states relative to ownership of real estate by As. vary, but in the majority of cases an A. may buy, sell, and devise real property. A friendly A.

may contract, sue, and be sued in the state and Federal courts while allowed to remain in the country, but may be expelled or deported at any time, subject to treaty stipulations. An A. enemy is not allowed to maintain any action in the courts of the U.S.A. (but he may be sued), nor can he enter into valid contracts with citizens. The percentage of A. pop. in the U.S.A. varies very much with the locality, from 2½ per cent to nearly 40 per cent.

**Alienation**, in law a term used to denote the voluntary transfer of estates from one person to another by conveyance and not by inheritance.

**Alif**, the first letter of the Arabic alphabet (see ALPHABET) and also of the word Allah (God). The letter is used as a symbol for the Almighty.

**Aligarh**, a city and dist. in United Provs. of India. It became a fortress in 1759 under Sindhia acting for the Fr., and was stormed by the Brit. in 1803. There is a Moslem Univ., founded 1920. Area of dist. of A. 1957 sq. m.; pop. 1,300,000; city, 113,000.

**Alignments**, an archaeological expression used to denote the arrangement of rows of menhirs or upright stones in parallel lines. Famous examples are at Carnac in Brittany, and at Callernish in the is. of Lewis in Scotland.

**Alima**, a trib. of the Lower Congo.

**Aliment**, Alimentary Allowance, see ALIMONY.

**Alimentary Canal**, the name given to the whole digestive tract from the mouth to the anus. It includes the mouth, oesophagus, stomach, intestines with the caecum, rectum, and anus. See separate headings.

**Alimony** is the sum of money ordered by the court to be paid by either the husband or wife in a divorce case or judicial separation towards the maintenance of the other party. It must be proved that the person against whom the order is made has the means to pay. The amount may be agreed between the parties, otherwise one-fifth of the joint incomes is generally allowed. An order for *permanent* A. may be obtained by a wife who has obtained a final decree of judicial separation.

**Allen**, N. Wales, see ALLEN.

**Alington**, Cyril Argentine (b. 1872), dean of Durham. Educated at Marlborough and Oxford and served as an assistant master at that school and at Eton before becoming headmaster of Shrewsbury in 1908. In 1916 he became headmaster of Eton and dean of Durham, 1933. Author of: *A Schoolmaster's Apology*, 1914; *Eton Fables*, 1921; *Why we read the Old Testament*, 1923; *An Eton Poetry Book*, 1925; *More Eton Fables*, 1927; *Elementary Christianity*, 1927; *The Abbot's Cup*, 1930; *Final Eton Fables*, 1933; *Eton Faces—Old and New*, 1933; *Lionel Ford*, 1934; *Things Ancient and Modern*, 1936; *A New Approach to the Old Testament*, 1937; *The New Testament: A Reader's Guide*, 1938; *The Kingdom of God*, 1940; *Poets at Play*, 1941; *In Shabby Streets*, 1942.

**Aliphatic Compounds** form one of the great divs. of organic compounds. They are so called on account of the fact that the fats are among the most typical members of this div. (Gk. *ἀλειφω*, fat). A. Cs. are characterised by the open-chain skeleton of carbon atoms in their molecules, as contrasted with the closed-ring skeleton found in aromatic and heterocyclic compounds. All A. Cs. may be regarded as ultimately derived from methane or marsh-gas,  $\text{CH}_4$ , by processes of replacement. Among the principal members of the group are the *paraffins* (including methane, ethane, pentane, petrol, paraffin oil, lubricating oil, vaseline, and paraffin wax), the *olefines* (e.g. ethylene,  $\text{C}_2\text{H}_4$ ), *acetylene* ( $\text{C}_2\text{H}_2$ ), the *alcohols* (q.v.), *ether*, *chloroform*, *acetic* and other acids, *esters* (e.g. ethyl acetate or acetic ether), certain classes of *amines* (q.v.), the *carbohydrates*, such as starch, sugar, and cellulose, and of course the *fats* themselves. In general properties, A. Cs. are distinguished from aromatic compounds in numerous ways, particularly in their behaviour with nitric acid and sulphuric acid.

**Alipur**, an important suburb of Calcutta, containing some of its finest public buildings.

**Aliscans**, or **Aleschans**, a medieval cemetery near Arles that gave the name to a *chanson de geste* of the Carolingian epic cycle. The most important episodes are the 2 battles at Alyscamps (Elysi Campi) near Arles. In the first battle William 'Court Nez' is beaten by the Saracens, but in the second he takes his revenge.

**Alishan**, **Leon**, Armenian poet and historian, b. at Constantinople in 1820. He occupied a chair in the Raphael College at Venice. He is considered the greatest Armenian poet. His works include *Popular Songs of the Armenians*, historical monographs, translations of Eng., Ger., and Fr. poetry. His knowledge of hist. was extensive, and he wrote a *History and Geography of Armenia*.

**Alison**, **Sir Archibald** (1792-1867), the younger son of the Rev. Archibald A. H. in Shropshire, studied at Edinburgh Univ. Called to Scottish bar in 1814. Toured the Continent and was made an advocate-depute for Scotland in 1822. Became prominent as an authority on politics and law. Pub. *The Principles of Criminal Law of Scotland*, 1832-1833. Among his other works are a *History of Europe during the French Revolution*, 1842, and *Principles of Population*, 1840. Created baronet in 1852.

**Aliwal North** is a tn. and dist. of S. Africa on the Orange R. It is a trading and agric. centre for the N.E. part of the Cape Prov. and the adjacent regions of Basutoland and Orange Free State. It contains many fine buildings and avenues; pop. 6297, a quarter of whom are whites.

**Aliwal South**. See MOSSEL BAY.

**Alizarin**,  $(\text{C}_{15}\text{H}_8\text{O}_4(\text{OH})_2)_n$ , an  $\alpha$ -dihydroxyanthraquinone, a derivative from anthraquinone, known to the

ancients, as extracted from madder-root, and used by them for dyeing. It is now prepared synthetically from anthracene. A. crystallises in dark red prisms and sublimes in orange-coloured needles, melting at  $290^\circ \text{C}$ . It is almost insoluble in water, but dissolves in alcohol. It yields with metallic oxides magnificently coloured insoluble compounds called 'lakes,' to which it owes its great value for dyeing purposes. Ferric oxide with A. gives a violet-black compound, chromium oxide a claret, calcium oxide a blue, and aluminium and tin give different shades of red.

**Aljubarrota** is the name of a tn. in Portugal. Here John I. of Portugal defeated John I. of Castile, and secured his country's independence, Aug. 14, 1385.

**Alk**, the resin obtained from the turpentine tree (*Pistacia terebinthus*), which grows chiefly in the region of the Mediterranean. In its fluid state it is called Cyprian or Chian turpentine.

**Alkalest**, see ALCAHEST.

**Alkali**, the name applied to a group of metals comprising lithium, sodium, potassium, rubidium, and cesium. These metals form hydroxides which are soapy to the touch and are easily distinguished from acids and neutral bodies by their action on litmus, turmeric, methyl-orange, and other indicators. The term is sometimes applied to the hydroxides only, but in the important A. manuf. it includes the carbonates, and is particularly associated with carbonate of soda.

The hydroxide and carbonate of the radical *ammonium* ( $\text{NH}_4$ ) are included among the As.

The word A. is derived from the Arabic *al-qali*, ashes, from the fact that soda and potash were derived from the ashes of plants; in fact, for centuries this was the only known method of manufacturing soda. In 1793 the Fr. Gov. were faced with the necessity of finding some method of soda manuf., as, owing to the effect of the revolution on commerce, France was cut off from the chief sources of the world's supply. In response to the Gov.'s appeal, Nicolas Leblanc elaborated a process which has now become obsolete (having been replaced by the ammonia-soda process, for which see below), but was very largely employed for over a century. It consisted in heating salt with sulphuric acid, and subjecting the sodium sulphate so obtained, mixed with coal and limestone, to a high temp. in a reverberatory furnace. The sodium carbonate was then dissolved out of the residual mass, and the solution evaporated, when crystals of washing-soda or sodium carbonate decahydrate,  $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$ , were obtained. The Leblanc process would have been given up long before it actually expired but for the fact that 2 important by-products, viz. hydrochloric acid and sulphur, were obtained from it.

**Ammonia-Soda Process**.—In this process, brine is saturated with ammonia and filtered. The filtrate is then

treated with carbon dioxide in a carbonating tower, consisting of a series of cylindrical compartments through which the brine slowly percolates. The carbon dioxide is blown in at the bottom of the tower, so that the following reaction takes place:  $\text{NH}_3 + \text{NaCl} + \text{H}_2\text{O} + \text{CO}_2 = \text{NaHCO}_3 + \text{NH}_4\text{Cl}$ .

The liquid sludge that flows out at the bottom of the tower is filtered in vacuum filters, and the residue of sodium bicarbonate left in the filters is then heated, when it splits up into sodium carbonate, steam and carbon dioxide:  $2\text{NaHCO}_3 = \text{Na}_2\text{CO}_3 + \text{H}_2\text{O} + \text{CO}_2$ .

The main advantages of the ammonia-soda process (sometimes known as the Solvay process, after its inventor, a Belgian chemist) are: (i) it yields a very pure product, (ii) it requires much less labour, (iii) there are no noxious by-products.

Caustic soda, or sodium hydroxide ( $\text{NaOH}$ ) is obtained by heating sodium carbonate solution with slaked lime:  $\text{Na}_2\text{CO}_3 + \text{Ca(OH)}_2 = \text{CaCO}_3 \downarrow + 2\text{NaOH}$ , and by the electrolysis of brine; chlorine is given off during the electrolysis, and this also is a valuable chemical product. Sodium and potassium hydroxides are white, deliquescent, crystalline solids easily soluble in water. Like all A.s., they neutralise acids to form salts.

In medicine the term A. is restricted to the hydroxides, which are used as caustics and for the neutralisation of acids. Ammonia is particularly valuable for counteracting the poison in the stings of insects, immediate application generally having the result of neutralising the acid. A. poisoning is treated by giving the patient dilute acid, such as vinegar. As an antidote to acid poisoning, the carbonates should be used; powdered chalk, or, in an emergency, whitening scraped from the wall or ceiling is suitable.

**Alkali Lands** are regions where the soil contains quantities of A. salts, e.g. in Nebraska, Montana, and New Mexico. Such soil requires very little rainfall, and to prevent damage to the estates caused by abundant rainfall the lands are carefully drained and treated with gypsum.

**Alkaline Earths**, a name given to the group of metals comprising *magnesium, beryllium, calcium, strontium, barium, and radium*. Formerly the known oxides of these metals were considered to be elementary substances, and were known as earths. The oxides possess an A. reaction and neutralise acids.

**Alkaloids**, organic substances of complex composition and basic character found in plants of certain families. The name persists from the old classifications of organic substances into acids, bases, and neutrals to correspond with the classification of inorganic substances. The old name of A. (resembling alkali) has been retained in the absence of a better mode of classification. Only a few A., such as *conine* and *nicotine*, are liquids; most of them are crystalline solids. They are alkaline in reaction,

possess a bitter taste, and are generally insoluble in water, but soluble in alcohol. Some of them are excessively poisonous, the general antidote being strong tea. They are obtained by cutting up the plants and macerating the mass with acidified water in a conical vat, where a layer of lint receives the percolated liquid. If a volatile A., it is separated with steam after making the mixture alkaline; if an insoluble A., it may be obtained by filtration, after which it may be purified by crystallisation. The more important A.s. are:

**Coniine**, occurring in spotted hemlock. It is a colourless liquid with a stupefying odour, and is very poisonous.

**Nicotine**, occurring in the tobacco plant. It is a colourless oily liquid with a characteristic odour, and turns brown on exposure to the air; very poisonous.

**Atropine**, occurring in 'deadly nightshade.' It is a crystalline solid, extends the pupil of the eye and is very poisonous.

**Cocaine**, occurring in coca leaves. It is a crystalline solid, soluble in alcohol, and is used as a local anæsthetic.

**Morphine**, constituting 10 per cent of opium (prepared from the capsules of *Papaver somniferum*). It is a crystalline solid, and is used as an anodyne and narcotic.

**Narcotine**, constituting 6 per cent of opium. It is a crystalline solid, and slightly poisonous.

**Quinine**, occurring in cinchona. It is an important antifebrile and is a specific remedy for malaria.

**Strychnine**, occurring in *Strychnos nuxvomica*. It is a crystalline solid, and causes death by tetanic spasms.

**Alkan** (real name **Charles Henri Valentin Morhange** (1813-88), a Fr. pianist and composer, b. at Paris. He is best known for his numerous pianoforte studies, which, if difficult, added materially to the technical resources of piano composition (Scholes).

**al-Khalil**, see **HEBRON**.

**Al-Khwarizmi**, Arabian mathematician, b. in Khorassan, who fl. in the ninth century. He studied and made important astronomical calculations at Bagdad. He wrote sev. books on mathematics, among which was one on Hindu arithmetic, containing dissertations on the quadratic equations, etc. The original name of the work is *Al-jabr wa'l-muqabala*, which was corrupted into Algebra. This book was the basis on which all subsequent medieval works on algebra were founded.

**Alkindi**, an Arab philosopher and mathematician, b. at Basra. He fl. in the ninth century. He trans. Aristotle, and is the author of sev. original treatises. The Arabs consider him the supreme philosopher and regard him as the father of heir philosophy.

**Alkmaar** ('all sea'), an anct. tn. of the Netherlands. It is situated on the N. Holland Canal, and is itself intersected by a network of canals. The church and town hall are in Gothic style. Pop. 33,000.

**Alkoran**, see **KORAN**.

**Alkyl**, a chemical term denoting radicals of the formula  $C_nH_{2n+1}$ ; the chief members are *methyl* ( $CH_3$ ), *ethyl* ( $C_2H_5$ ), *propyl* ( $C_3H_7$ ), and *amyl* ( $C_5H_{11}$ ). These radicals do not stably exist in the free state, but are present in such compounds as alcohols, esters, aldehydes, ketones, and alkyl halides.

**Alkyl Oxides**, see **ETHERS**.

**Allard**, Jean François (1783-1839), a Fr. general who first served under Napoleon. In 1815 he left France and went to Lahore, where he entered the service of Ranjit Singh. He organised the army according to the Fr. model, and was made generalissimo of the forces. He d. in India.

**All Fools' Day**, Apr. 1. The custom of sending one upon a pointless errand is supposed to have been a burlesque of the sending hither and thither of Christ from Annas to Caiaphas, and from Pilate to Herod.

**All-Hallows**, **All-Hallowmas**, or simply **Hallowmas**, the O.E. name for All Saints' Day, Nov. 1. See **ALL SAINTS' DAY**.

**All Hallows**, **Barking**, see **under BARKING**.

**All Saints' Bay**, on which stands São Salvador or Bahia, is situated on the E. coast of Brazil. It is 37 m. long from N. to S., and 27 m. wide in the widest part from E. to W., and is supposed to be large enough to afford anchorage for the navies of the whole world.

**All Saints' Day** (Nov. 1), called in O.E. **All-Hallows**, **All-Hallowmas**, or simply **Hallowmas**, is a feast in honour of all the saints, and was first definitely instituted in 835. The evening preceding All-Hallows is called *Hallowe'en*, and on this night ceremonies of Druidical origin—bonfires, bell-rings, and domestic merry-makings, in which lamb's-wool (ale or wine mixed with the pulp of roasted apples) was the prin. beverage—were once held. In England, Scotland, and Ireland fireside ceremonies were held, and the future was supposed to be made known. An account of these ceremonies is given in the poem of Burns entitled *Hallowe'en*.

**All Saints' Islands**, see **WEST INDIES**.

**All Souls' College**, Oxford, was founded by Henry Chichele, archbishop of Canterbury, 1437. In 1442 it was capable of receiving the warden and fellows, but it was not finished till the latter end of 1444.

**All Souls' Day**, a Rom. Catholic festival held on Nov. 2, which was first instituted by Odilo in the monastery of Cluny, 998, and the observance soon became general in all Rom. Catholic countries. On this day prayers and offerings are made for the dead.

**Alla breve**, a musical expression placed at the beginning of a piece, signifies that the time value of the notes is reduced to a half.

**Allah** (Arabic), the name used by Muslims to denote the Supreme Being. The word is a compound of 2 words, *al*, the definite article, and *lah*, God. The same word may be found in Arabic, Aramaic, Heb., and Old Arabic.

**Allahabad**, 'the holy city' of the Muslims, situated at the junction of the Rs. Jumna and Ganges in United Provs., India, and also gives name to the dist. The most prominent part of the city is the fort built by Akbar, who gave the name **A.** to the city. Frequent pilgrimages are made to the city by the Hindus. The prov. of **A.** was successively subject to the rulers of Delhi and Oude, but in 1801 was incorporated with the Brit. possessions. A fair is held annually in Dec.-Jan. In 1861 it was made cap. of the N.W. Provs.; and in 1887 the univ. was instituted. In front of the gateway inside the fort is the Asoka Pillar, 35 ft. high, on which are inscribed the famous Edicts of Asoka issued about 242 B.C. and a record of the victories of Samudragupta about A.D. 350. There are 2 cathedrals, a public library, a garrison; Muir College, and the Mayo Memorial Hall with a tower 147 ft. high. A high court of the Agra Prov., with a chief justice and 10 permanent judges, sits at **A.** On the chief day of the fair about 1,000,000 pilgrims bathe at the confluence of the rivs. Pop. 263,000.

**Allamanda**, a genus of tropical plants of the order Apocynaceæ. *A. cathartica*, a climbing plant with yellow flowers, from the W. Indies, has emetic and purgative properties, and is used as a cathartic.

**Allan**, David (1711-96), Scottish historical painter, b. at Alloa. Studied at Glasgow and Foulis's Academy, and later at Rome. Secured gold medal for his 'Origin of Painting.' Chief pictures, 'Highland Dance' and 'Scotch Wedding.' D. at Edinburgh.

**Allan**, Sir Hugh (1810-82), founder of the Allan Line (q.v.), was b. at Saltcoats in Ayrshire. He emigrated to Canada, and was one of the promoters of the Canadian Pacific Railway. He was knighted at 1871, and d. at Edinburgh.

**Allan**, Sir William (1782-1850), painter of historical scenes and studies of Russian life. B. at Edinburgh; educated at High School there. Studied art under Graham of the Trustees' Academy with Wilkie, Burnet, and Alexander Turner. First exhibited picture, 'A Gipsy Boy with an Ass.' Among his famous paintings are: 'Peter the Great teaching his Subjects Shipbuilding,' 'The Stirrup Cup,' and 'Knox admonishing Mary Queen of Scots.' In 1805 went to Russia, but returned to Edinburgh, 1814. Attacked by ophthalmia in 1830, he travelled widely for rest and change. D. in Edinburgh.

**Allan Line**, a Brit. steamship company founded in 1852 by Sir Hugh Allan. The ships touch the prin. Canadian ports and sev. ports of U.S.A. and S. America. Was amalgamated with the Canadian Pacific Steamship Company in 1916.

**Allantoin** ( $C_4H_6O_4N_2$ ), an organic substance found in the allantoid fluids of many animals. It is also formed in the oxidation of the uric acid with potassium permanganate, thus throwing light on the constitution of uric acid.

**Allantois**, a foetal membrane derived

from the mesoblastic and hypoblastic layers, characteristically developed in birds, reptiles, and mammals. In birds and reptiles it is developed from the lower end of the digestive tube, and has first the form of a small ovoid sac, but increases rapidly in size and makes its way into a space between the amnion and the serous membrane. It finally encloses the whole embryo and yolk-sac together with the remains of the albumin, which by this time has been largely absorbed. The A. serves as a respiratory organ, exchange of gases readily taking place through the porous shell; its cavity serves as a urinary bladder, excrement being discharged into it from the kidneys. In many mammals a connection is often estab. between the A. and the uterine wall, by which nourishment is conveyed to the embryo. At birth this connection becomes part of the umbilical cord and is cast off, whilst the part that remains within the body develops into the urinary bladder.

**Allatius, Leo** (1586-1669), a Gk., who was b. in the is. of Chios, where he founded a college, and d. at Rome. He was educated at the Gk. College, Rome, and after visiting his native country returned to Rome, where he was appointed librarian to the Vatican. He ed. MSS., trans. Gk. authors, and wrote original works. See his treatise *De Ecclesiæ Occidentalis et Orientalis perpetua Consensione*.

**Alleghany Mountains**, See APPALACHIAN MOUNTAINS.

**Allegheny**, a city in A. co., Pennsylvania, U.S.A., on the A. and Ohio R.; 1 of the chief manufacturing dists. of Pennsylvania. An important railway terminus, has large manufactories, public buildings, and higher schools of learning. Six bridges connect A. with Pittsburgh. Its industries include foundries, woollen mills, and locomotive works. In 1907 A. was annexed to Pittsburgh. In 1874 A. suffered from a fire which destroyed 200 buildings, followed by a flood causing many deaths. It has several Presbyterian theological seminaries. Pop. 131,000.

**Allegheny River**, see MISSISSIPPI RIVER.

**Alliegance** has been defined by Coke as 'the highest and greatest obligation of duty and obedience' of a subject, and a violation of A. constitutes the highest legal offence, namely treason. Every natural-born subject, every naturalised citizen, and every alien while within the kingdom, owes this duty to the king, his liege lord. Most public officials and many professional men are required to take the *Oath of Allegiance* when entering on their career. The claim of the popes of Rome to temporal power, particularly in the matter of releasing Catholics from A. to heretical sovereigns, was for about 2 centuries the cause of great difficulty in this country. The Oath of A., drafted in the reign of James I., required Catholics to reject this doctrine, and was considered by them to be unnecessarily offensive to their faith, but after long

controversy and not a little persecution it was freed from this objection in 1778.

**Allegory**, a Gk. word signifying the description of one thing under the image of another, derived from ἀλλος, other, and ἀγορεύειν, to harangue. In literature, a figurative discourse in which the writer or speaker conveys to the mind a parallel idea by its resemblance in its properties and circumstances to the subject of his ostensible discourse. In this respect it resembles metaphor, and A. has often been described as 'extended metaphor.' This is the most usual signification of the word, but it is also used for other forms of art, and may be applied to painting, sculpture, or the histrionic art. As painting, one may mention the famous picture of Prud'hon, 'Justice and Vengeance pursuing Crime,' and the many allegorical pictures of the great Eng. painter, G. F. Watts. The well-known picture of Holman Hunt, 'The Light of the World,' hung in St. Paul's Cathedral, is a good example of pictorial A. Reynolds-Stephens's group, representing Queen Elizabeth and Philip of Spain playing on a chess-board with ships as pieces, depicts in sculptural A. the struggle for sea supremacy between 2 nations. Returning to literature, in all branches of which one finds the use of A., it is important to realise the difference between A. and the fable. The fable, or, as it is sometimes termed, the apologue, has for its object the conveying of some moral precept or enforces some lesson for daily life, but an A. is by no means so limited in its scope. A further differentiation may be made that while, on the one hand, the merit of a fable lies in, and its lesson is emphasised by, its improbability, as, for example, Æsop's fable of the *Fox and the Viper*, where 2 inarticulate objects speak; on the other hand, the A. depends for its excellence on its fidelity and its detailed correspondence to actual existence. A. has always been used for the personification of abstract ideas, and for its value in this direction has been much employed to assist the mind in grasping abstract principles. This teaching of the abstract by the concrete was often employed by Christ and other biblical characters in the form of a parable, or short A., to bring home to their auditors in a more facile manner religious truths. But this personification of the abstract is not the whole function of A., and it has been employed to represent persons and countries. Thus, Edmund Spenser in his *Faerie Queene* depicts the Earl of Leicester, Sir Philip Sidney, and other Elizabethans, including the queen herself. Sir Thomas More, in his *Utopia*, sets forth by an A. about an imaginary country his opinion as to how a country should be governed, and Dean Swift, 2 centuries later, in his well-known A., *The Battle of the Books*, a satire on the ancients-versus-moderns controversy raised by Perrault, and *A Tale of a Tub*, satirises the shams and follies of his time. It is a fact not to be lost sight of that the indirect attack of abuses



by means of the A. was often the only method open to the would-be reformer. The use of A. dates from the earliest ages, and especially among the peoples of the E. It follows from the utility of A. for conveying more easily abstract ideas to the mind that philosophers should use it in the instruction of their pupils. Among those to employ this method of instruction one of the earliest was Plato, and nowhere does he employ it more effectively than in his famous A.—perhaps the most famous of all ancient As.—of the 'Cave,' which is to be found in his *Republic*. By means of an allegorical story of men in a cave believing that their shadows, thrown by a fire behind them on to the wall, are realities, he seeks to show the difference—a commonplace in all philosophical discourse—between the permanent 'idea' and the ever-changing phenomenal world of 'appearance.' The term to allegorise, i.e. to interpret the literal significance of a narrative, giving it an esoteric or more spiritual meaning, is the converse of the above. Among those to apply this method to the Scriptures were Philo the Jew of Alexandria, who in the time of Christ so interpreted the O.T., and his method was followed by the early Christian sect of the same city, notably by Origen (A.D. 185-254). The latter had the hardihood to explain, what is of course universally conceded to-day, that the story of the Garden of Eden and the Fall was an A. The Neo-Platonists similarly sought to arrest the decay of Gk. mythology at about the same time and by the same methods. A. passed into the Middle Ages, and took its place in the 'miracle' plays of the time, and in the 'moralities' of the fifteenth and sixteenth centuries. Among the best known of these 'moralities' is that called *Everyman*, an A. in which all men are personified in Everyman, who is called upon by God to give an account of his life. As was to be expected, the A. has played a large part in the development of poetry, and it was employed to such good purpose by Geoffrey Chaucer, the father of Eng. poetry, when he trans. the medieval *Roman de la Rose*, that he influenced for nearly 200 years the poets who followed him. Chaucer's contemporary, Langland, produced in 1362 a remarkable A., *The Vision of Piers Plowman*, in which he satirised the customs of his time. With Edmund Spenser's *Faerie Queene* (1590) A. again rises to great heights in poetry, but perhaps the best known of all As. in the Eng. tongue is the *Pilgrim's Progress* of John Bunyan (1678). This story of the journey of Christian from 'this world to the next,' and the story of the siege of 'Mansoul,' told in his book *The Holy War*, are written in the purest Eng. Another well-written A. is Addison's *Vision of Mirza*, which appeared in the *Spectator*. Of modern As. one may mention Olive Schreiner's *Dreams*, Jack London's *White Fang*, and Anatole France's *Ile des pingouins* in prose, and

Maeterlinck's *Blue Bird* and Edmond Rostand's *Chantecler* in drama.

**Allegretto** (It. dimin. of *allegro*), a musical term—a movement or time not so quick as *allegro*, but quicker than *andante*.

**Allegri, Antonio**, see CORREGGIO.

**Allegri, Gregorio** (1590-1632), musical composer, b. in Rome. He will always be remembered as being the composer of the famous *Miserere* written for 9 voices, and to-day sung in Holy Week in the Sistine Chapel.

**Allegro** (Lat. *alacer*, joyful, brisk), a musical term denoting a brisk, sprightly movement.

**Allen, Alin, or Alyn**, a trib. of the Dee, N. Wales. It rises in Denbighshire and flows through Flintshire into the Dee.

**Allen, Bog of**, is the name given to a series of morasses in the cos. of Kildare, Offaly, and Leix.

**Allen, Charles Grant** (1848-99), Eng. author, was b. at Kingston, Canada. Studied at Oxford, and graduated in 1870. Became schoolmaster in Jamaica, but made a permanent home later in England. Possessed good scientific knowledge and gift of expression. Chief works of science are: *Physiological Aesthetics*, 1877; *The Evolutionist at Large*, 1881; *The Evolution of the Idea of God*, 1897. Among his best novels are: *The Devil's Die*, 1888; *The Great Taboo*, 1890; and *The Woman who Did*, 1895.

**Allen, Henry T.** (1850-1930), Amer. soldier, b. at Sharpburg, Kentucky, U.S.A. Graduated U.S. Military Academy 1882. With the Mexican punitive expedition in 1916. Went to France as commander of the 90th Div. of the Amer. Expeditionary Force in 1917. Commander-in-chief of the Amer. army of occupation in the Rhineland, July 1919.

**Allen, Horatio** (1802-89), Amer. civil engineer, b. at Schenectady, New York. He made the first railway trip in America, operating the Stourbridge Lion b. 1829 at Honesdale, Pennsylvania. He was chief engineer of the S. Carolina railway and later the Erie railway, of which he was also president. He was consulting engineer to the Panama railway and president of the Amer. Society of Civil Engineers.

**Allen, Sir Hugh Percy** (1869-1946), Brit. prof. of music, b. at Reading. Began his musical career at Chichester Cathedral as assistant organist. In 1897-98 he was Organist at St. Asaph Cathedral. Conductor of the Bach Choir, London, 1901-20; prof. of music, Oxford Univ., from 1918; and director of the Royal College of Music, London, until 1937. As prof. of music at Oxford, A. did valuable work in widening the scope and practicality of the courses there; while as a choral conductor he was always highly successful.

**Allen, Ira** (1781-1814), first secretary of Vermont; b. in Cornwall co.; removed to Vermont, 1772, where he served as lieutenant under his brother Ethan, who captured the port of Ticonderoga from

the Eng. in 1775. As a member of the legislature he was zealous in asserting the independence of Vermont. He took an active part in the negotiation re the 'New Hampshire Grants.' In 1795 he visited Europe to buy arms, and was arrested at Ostend and brought to England, where he was charged with supplying arms to the Irish rebels. He was acquitted after litigation lasting 8 years.

**Allen, Karl Ferdinand** (1811-71), Dan. historian. He was prof. of hist. and archaeology at Copenhagen, and was a keen democrat. His chief works are a *Manual of Danish History*, 1840, and a *History of the Three Northern Kingdoms*, 1864-72.

**Allen, Ralph** (1694-1764), the Man of Bath, an Eng. philanthropist. He was acquainted with Pope and Fielding and he appears as Squire Allworthy in *Tom Jones*. His benevolence became proverbial.

**Allen, William** (1532-94), cardinal. b. at Rossall; educated at home and afterwards at Oxford. Graduated in 1550 and elected fellow in the same year. In 1556 chosen prin. of St. Mary's Hall, Oxford. His zeal for the Catholic faith offended the civil authorities and he went to Holland. He became priest at Mechlin in 1557, made a pilgrimage to Rome, and was created cardinal in 1587.

**Allenby, Field Marshal Sir Edmund Henry Hynman, Viscount of Megiddo and of Felixstowe** (1861-1936). Brit. soldier, educated at Haileybury and Sandhurst. Entered the Army in 1882, in Inniskilling Dragoons. Gained distinction as a column commander in the S. African War 1899-1902. Became inspector-general of cavalry, which post he held till 1914. In the First World War he won a brilliant reputation first as a cavalry leader, then as an army commander in France, and finally as the commander-in-chief of the Egyptian Expeditionary Force. A somewhat relentless soldier, yet scientific, who laid his plans with all the skill and foresight of the most learned prof. of a military college, his qualities, combined with an admirable physique and fearless character, are essentially those which go to the making of a perfect soldier. In France in 1914 he was conspicuous at Mons and in the Great Retreat, leading a cavalry div. with consummate skill, putting up a notable resistance at Hallebeke in the Ypres battle of Oct. 1914. He was then promoted successively to corps commander and army commander (3rd Army), and rendered valuable services at the battle of Arras (1917). In Egypt he took over the chief command from Sir Archibald Murray, who had, with painstaking preparation, succeeded in advancing as far as the N. edge of the Sinai Desert. The task which confronted A. was the capture of Gaza, a naturally strong position and artificially reinforced by cunning field-engineering work. To the accomplishment of this task he brought administrative ability of a high order, and a patient study of the vast problems of supply and transport,

the difficulty of which was enhanced by desert conditions. His strategy and tactics were masterly. Beersheba was captured and within 6 weeks of the commencement of his advance Jerusalem surrendered to the Brit. Army. Many of his troops were then transferred to France to repair losses, and he had perforce to spend much time in reorganising his army with less trained men, among whom were Indian troops. But again his organising capacity proved equal to his next task, which was the final overthrow of the whole Turkish Army, which he effected by executing one of the greatest campaigns of movement in the hist. of warfare, his army sweeping resistlessly forward beyond the Jordan Valley to Damascus and Aleppo, after a crushing victory in the battles of Megiddo (Sept. 18 to Oct. 31), 1918. For those services he was given a viscounty and Parliament voted him a grant of £50,000. In 1919 he was appointed to the post of high commissioner in Egypt, where the rise of the Nationalist party and the aspirations of Egypt to sovereign independence demanded the utmost tact, as well as great administrative capacity, to the end that a settlement might be effected which should safeguard Brit. interests without forfeiting the confidence of the Egyptian people. He returned to England in 1922, in which year Egypt was declared an independent kingdom. Named after him is A. Bridge (built in 1927) which crosses the Jordan, 1200 ft. below sea level, on the road between Jerusalem and Amman. *See also* EGYPT. *See* Viscount Wavell: *Allenby: Soldier and Statesman—A Study in Greatness*, 1910; *Allenby in Egypt*, 1913.

**Allende**, a tn. of Mexico in the Guajalato state, about 250 m. N.W. of Mexico and with a pop. of 16,000.

**Allenstein (Olaszyn)**, tn. of Poland (till 1945, E. Prussia) on R. Alle. Here the Russians and Prussians were defeated by Soult in 1807. The tn. has sev. breweries. During the First World War, the Russian armies, under their generalissimo, the grand duke Nicholas, when invading E. Prussia, in 1914, were opposed by 3 serious obstacles; the rivers, lakes, and marshes between Insterburg and Johannisburg, the 2 Ger. army corps at Königsberg and Allenstein respectively, and the line of the Vistula. Gen. Rennenkampf, defeating the Gers. at Gumbinnen, Aug. 17-20, drove them out of Königsberg, while another and larger Russian army broke through between the lakes and the Vistula and captured A. This, however, marked the limit of Russian success against Germany in the First World War, for at Tannenberg on Aug. 26 Gen. von Hindenburg completely routed them. (*See* TANNENBERG.) Pop. 42,200.

**Allentown**, co. tn. of Lehigh co., Pennsylvania, on the Lehigh R. Important manufacturing centre. Silk and silk goods are the most important industry. The tn. was settled first in 1751, and owes its name to John Allen, son of chief justice of the prov. Pop. 96,900.

**Alleppi**, or **Aulapalai**, in Travancore, India, is a seaport. First in commercial importance. Fine harbour, rajah's palace, and a Protestant church. Lies 33 m. S. of Cochin. Pop. 30,000.

**Allerion**, or **Alerion**, a heraldic device, consisting of an eagle with outspread wings, but without beak or feet. Example of it in Montmorency arms.

**Allestree**, or **Allestry**, **Richard** (1619-81), divine, b. at Uppington, Shropshire. His family came of good stock but were reduced in circumstances. He was educated at the grammar school, Coventry, and at Christ Church, Oxford. His early studies at college were interrupted by the civil war and he took service in the royal forces. When the parl. forces sacked the colleges, A. at great risk saved many Christ Church treasures. After military service he took orders. He was expelled from the univ. for refusing to submit to the authority of parliament. At the Restoration he was made canon of Christ Church and regius prof. of divinity in 1663. His most noted work is his treatise on *Privileges of the University of Oxford*.

**Alleyne**, **Edward** (1566-1626), actor, and founder of Dulwich College, b. near Bishopsgate, London. Married Henslowe's stepdaughter in 1589. In 1600 built, with Henslowe the fortune Theatre, London. In 1604 became master of the royal games of bears, bulls, and mastiffs. Retired from the stage, 1604. Building of college began 1613. Obtained royal charter in 1619 after some objection by Francis Bacon, Lord Verulam.

**Allgemeine Zeitung**, full title *Deutsche A.Z.*, formerly *Norddeutsche A.Z.*, a Ger. newspaper of world-wide reputation, was founded at Stuttgart in 1798 by the famous publisher, Johann Friedrich Cotta, in succession to his Tübingen venture, the *Neueste Weltkunde*, which had been suppressed by the authorities. On incurring the displeasure of the Duke of Württemberg in 1803 the paper transferred its headquarters to Ulm, and subsequently, in 1810, on that tn. becoming incorporated in Württemberg, to Augsburg. Here it first obtained wide influence and recognition, and gained the support of many distinguished statesmen and thinkers. In 1882 it was transferred to Munich, where it was pub. weekly. In subsequent years it did not maintain its old prestige. Until the revolution following the First World War it was the semi-official organ of the Ger. Gov., and as such, contained reports of ministerial speeches in the Reichstag, official *dé-ments*, and 'inspired' articles. In 1920 it was sold to Hugo Stinnes, and, later, was controlled by the Nazis.

**Allia**, also spelt **Alia**, is a small trib. on the l. b. of the Tiber, about 11 m. N. of Rome. Here the Romans were defeated by the Gauls in July 390 B.C.

**Alliaceae** **Plants** are those which belong to the *Allium* genus, or simply onion-like plants. The inflorescence is umbellate, and the various species have tunicated bulbs, or swollen underground buds, which are cultivated for culinary purposes.

**Alliance**, **Holy**, see **ALEXANDER I.**, **EMPEROR OF RUSSIA**.

**Alliance** is a union between nations or govts. formed by treaty, league, or agreement. Some definite aim, pointed out clearly in the agreement, has generally been the cause of an A. Thus in 1688 the Triple A. between Great Britain, Sweden, and the Netherlands had as its object the diminution of the power of Louis XIV. The Grand A. of 1689 was formed also for the same object. The Quadruple A. of 1814 between Great Britain, Austria, Russia, and Prussia was directed against Napoleon and his dynasty, and towards keeping back France within her boundaries. The object of the Triple A. of 1882 between Germany, Austria, and Italy was the preservation of European peace against any possible aggressive action of Russia or France. This led to the Dual A. of France and Russia, having as its object mutual help in case of any hostile action on the part of the afore-mentioned powers. Sev. attempts have been made to generalise the character of A. For example, the Holy A. of 1815 was an attempt to find in the teaching of the Gospels a common basis of a general league of the European govts., having as its object the preservation of peace. One of the most important As. of modern times was the offensive and defensive A. effected between Great Britain and Japan in 1902 and modified in 1905. The terms of this A. were pub. to the world. It terminated in 1921 as a result of the Washington Conference. On the outbreak of the First World War the Triple A. broke up owing to the refusal of Italy to act with Germany and Austria-Hungary. This removed from France a potential enemy in her rear whilst facing Germany and allowed her to concentrate her forces. Italy entered the war on the side of the Entente in the spring of 1915, which in some measure counterbalanced the ineffectiveness of Russia.

The Triple Entente, or informal A., before the First World War embraced Great Britain, France, and Russia, and was concluded in 1907. Although at this time a formal A. existed between France and Russia, there was no binding agreement between the 3 powers to take a common course should one be engaged in war. In order to strengthen this bond and to have a clear understanding on the matter, the 3 powers signed the pact of London on Sept. 5, 1914, each declaring that it would not conclude a separate peace or demand terms at the eventual peace conference without consulting the others. Japan signed the pact in Oct. 1914. When the Bolsheviks secured control in Russia they concluded a separate peace with the central powers in Mar. 1918 and broke up the Triple Entente. Great Britain's only A. now is with Portugal (providing for mutual assistance if either of the 2 countries were attacked; but it involved no obligation for Portugal to fight in the second World War, and she remained

neutral); though, in view of the menace of Germany's policy of European domination, Great Britain in conjunction with France in 1939, made pacts with Rumania, Greece, and Poland, guaranteeing their integrity, her policy being to form a peace bloc which should serve as an effective substitute for the collective security it was, at one time, hoped to procure under the Covenant of the League of Nations (q.v.). In the result the guarantees brought a Brit. declaration of war against Germany on the latter's invasion of Poland. An Anglo-Fr.-Turkish pact of assistance was signed on Oct. 19, 1939, valid for 15 years, which provided, *inter alia*, that Turkey was to aid Britain and France in the event of aggression by a European power leading to war in the Mediterranean, and if Britain had to fulfil her guarantees to Greece, but these undertakings were not, in fact, fulfilled. See further under EUROPE, *History during the European War, 1939-1945*. U.S.A. has no A. with any country. The Locarno treaties (1925) between Great Britain, Germany, France, Italy, Belgium, Czechoslovakia, and Poland contained mutual obligations designed to prevent wars of aggression among the signatories and to a limited extent constituted an A. or series of As., but their denunciation by Germany destroyed their value as a guarantee of peace in Europe. (See LOCARNO TREATIES.)

**Alliance**, a city of Stark co., Ohio, U.S.A. Manufs. iron and steel goods and organs. Pop. 22,000.

**Alliaria officinalis**, or *Sisymbrium alliaria*, commonly known as garlic-mustard, sauce-alone, or Jack-by-the-hedge, is a well-known cruciferous plant indigenous to Great Britain and many other parts of the globe.

**Allibone, Samuel Austin** (1816-89), Amer. author, b. at Philadelphia, Pennsylvania. His chief study was in bibliographical research, and he studied Amer. and Brit. literature. Became librarian of the Lenox library, New York City, in 1879. D. at Lucerne. Pub. 3 anthologies, and a critical dictionary of Eng. literature, which is still of great service.

**Allice**, see ALOSE.

**Allier**, riv. of central France, flowing into the Loire. Rises in the Margeride Mts. in Lozère. Moulins is the chief tn. on its banks. It is the boundary line between Cher and Nièvre.

**Allier**, a dept. of central France. Is a hilly and wooded dist. especially in S.E. Drained by the Allier, Loire, and Cher. Cereals grown and exported. Minerals in abundance. Area 2849 sq. m.; pop. 369,000.

**Allies, Thomas William** (1813-1903), Eng. historical writer, b. near Bristol. Became a fellow of Wadham College, Oxford, in 1833. In 1850 became a Rom. Catholic, after resigning the living of Taunton. Secretary of Catholic Poor Schools Committee. Wrote sev. books on Rom. Catholicism.

**Alligator** (Sp. *el lagarto*, the lizard), of family Crocodylidae and order Eusuchia, is a reptile of which there are only 2

living species, *A. lucius*, in the Mississippi and other large rivs. of America, and *A. sinensis*, in the Yangtsekiang. It differs from the caiman (q.v.) by having a bony septum between its nostrils, and its ventral scutes are thin, if at all, ossified; it differs from the crocodile (q.v.) by having a broad head, depressed and obtuse muzzle, unequal teeth, the fourth from the front on each side of the lower jaw being elongated and fitting into a cavity in the upper jaw when the mouth is closed, the hinder limbs lack a fringe of acute scales, and the toes are only slightly webbed. It is a carnivorous and piscivorous animal, and will devour dogs or pigs, but seldom attacks man unless molested. The strong tail by its lashing movement



ALLIGATOR

assists it in swimming, during which exercise it emits a loud bellowing. The eggs are deposited in layers in sand, and incubation covers a period of about 3 months. The female A. is a tender mother, providing food for her young and guarding them from their many foes, such as large fish and turtles. The skin of the A. is a valuable object of commerce, used in the manufacture of purses, cigarette-cases, and other articles, and the teeth are sold for ivory. From the Upper Cretaceous to the Pliocene period these animals ranged N. Europe.

**Alligator Apple**, or *Anona palustris*, is a compound fruit of the genus *Anona*, of the Custard-apple family. See ANONACEÆ.

**Alligator Fish**, the *Podothecus* of the family Agonidae, and order Teleostei. It is a small fish of the cold seas, and its body is covered with bony plates. *P. uciopenserinus* inhabits the Pacific Ocean.

**Alligator Lizard**, a name applied to sev. species of *Sceloporus*, family Iguanidae of the Lacertilia. The scales are flat and the heads are not spiny; they are viviparous. They are found chiefly in S. America.

**Alligator Pear**, see AVOCADO PEAR.

**Alligurr**, see ALIGARRH.

**Allin, Sir Thomas** (1812-85), a naval commander, b. at Lowestoft. A. took

a prominent part in the Royalist struggles. He was sent as commander-in-chief to the Mediterranean, where he captured sev. Dutch men-of-war. He brought the Barbary States to subjection in 1669. In 1670 he was controller of the navy, and in 1678 was commander-in-chief in the Channel. His life throughout was one of stirring sea-adventure.

**Allingham, William** (1824-89), a poet. He was b. at Ballyshannon, Donegal, Ireland, and worked in various custom-houses in England and Ireland until 1870. Became sub-editor of *Fraser's Magazine*. Was friendly with D. G. Rossetti. In 1850 pub. a book of poems, and in 1855 his *Day and Night Songs*. Married Helen Paterson in 1874. Wrote *Lawrence Bloomfield*, a narrative poem dealing with Irish social questions. His wife (1848-1926) was known for her success in water-colour painting, and was an associate of the Royal Society of Painters in Water-Colours. She ed., jointly with D. Radford, *William Allingham's Diary*, 1907.

**Alliteration** is the term used to signify the frequent recurrence in composition of words commencing with the same letter, or with the same vowel or consonantal sound. 'When to the sessions of sweet silent thought I summon up remembrance' (Shakespeare) is an alliterative phrase, so also is the fanciful line, 'I know that gnat is not a knight,' for the same consonantal sound 'n' is repeated. The use of A. as an embellishment of prose and poetic compositions was not unknown to Lat. and Grk. writers, but it is in the Celtic, Teutonic, and Finnish-Hungarian tongues that A. has flourished most. Indeed it is not too much to say that A. is one of the distinguishing features of Eng. poetry, and, judiciously used, its most considerable ornament. Though not much used in Eng. prose, it has nevertheless been employed by great prose writers, especially in rhetorical passages. Bunyan's great allegory, *The Pilgrim's Progress*, opens with the fine alliterative line, 'As I walked through the wilderness of this world,' and Mr. Bernard Shaw's Caesar, to give a modern example, when apostrophising the Sphinx, uses this striking alliterative passage: 'I wander, and you sit still; I work and wonder, you watch and wait; I look up and am dazzled, look down and am darkened, look round and am puzzled. . . .'

A. bulks large in A.-S. and early Eng. poetry, where it precedes the use of rhyme. A common form of it was in couplets, where the first 2 words of the first line and the first word of the second all began with the same letter. *Piers Plowman* of Langland, a fourteenth-century poet, is a long poem, written entirely in alliterative verse. With the rise of rhyme the use of A. receded, and most of the great Elizabethan writers were severe critics of its injudicious use. The satirist Churchill ridiculed and at the same time exemplified A. in his well-

known line about 'apt, alliteration's artful aid.' But 'aptly' used, as it has been by poetic giants like Shakespeare and Coleridge, it has taken a firm hold on the affections of the Eng. people, and has greatly enriched our literature.

**Allmers, Hermann** (1821-1902), Ger. poet and artist, b. at Rechtenfleth, near Bremen. His first publication was *Marschenbuch*, a study of Frisian peasant life. His best work is perhaps his tragedy *Elektra*. Others are *Dichtungen* and *Römische Schlendertage*.

**Alloa**, seaport and co. tn. of Clackmannanshire, Scotland, on the Forth, 6 m. E. of Stirling; has breweries, distilleries, glass-works, woollen manufs., etc. Pop. 18,200.

**Allobroges**, an anct. Gallic tribe, occupying the land between the Rhône and Isère, now Savoy and Dauphiné. Their chief cities were Vienna (modern Vienne), Genoa (modern Geneva), and Cularo (modern Grenoble).

**Allocution** (Lat. *allocutio*, a speaking to), a term denoting the formal address given by the pope to the College of Cardinals on any matter of eccles. or political moment, and affixed to the door of St. Peter's.

**Allodium**, or **Allodial Tenure**, is a legal term used to signify land which is the absolute property of its owner, free from any feudal tenure or obligation to a superior. Since the Norman Conquest there has been no allodial land in England, for the laws declare all land to be the property of the king. Before the Conquest the right was held to a certain extent, and it was common throughout the rest of N. Europe. In Scottish law the term is applied to movable property, crown, and eccles. property, and land bought under the Scots Land's Clauses Consolidation Act. The term is also to be found in the udal rights of the Orkney and Shetland Is.

**Allogamy** (Gk. *άλλος*, other, and *γάμος*, marriage), or cross fertilisation, the transference of the pollen of one flower to the pistil of another. There are 2 types—(1) Geitonogamy, in which the fertilised flower is on the same plant; (2) Xenogamy, in which it is on another plant.

**Allopathy**, usually applied to the orthodox method of therapeutics as opposed to homœopathy. Hahnemann, the inventor of the term and the promulgator of homœopathy, designated as A. that method of the treatment of disease consisting in the use of medicines the action of which upon the body in health produces morbid phenomena different from those of the disease treated. Homœopathy, on the other hand, consisted in the use of medicines which, by experiment on persons in a state of health, are known to produce morbid phenomena similar to those of the disease treated.

**Allophane** (Gk. *άλλος*, other, *φαίνεσθαι*, to appear), a hydrous aluminium silicate of blue, green, or brown colour, found in Saalfeld in Thuringia and Schneeberg in Saxony.

Allori, Cristofano (1577-1621), son of the painter Alessandro Allori of the Florentine school, was himself a painter. He studied under Paganini, one of the greatest colourists of the time. His most celebrated work is 'Judith with the Head of Holofernes' in the Pitti Palace, Florence. His works are distinguished by delicacy, rich colouring, and technical accuracy.

**Allotments.** An A., in England and Wales, is defined by statute as a piece of land, not more than 5 ac. in extent, which is cultivated as a farm or garden, or, in other words, it is a small agric. holding. 'A time there was ere England's griefs began, When every rood of ground maintained its man,' sings the poet Goldsmith; but that time began to decline in the fifteenth century, and continued till at the present day the great mass of the people are divorced from the land, and even those still engaged in agriculture work only as the hirelings of large landowners. In the spacious days before the rise of modern industrialism and before the numerous Inclosure Acts of the seventeenth, eighteenth, and nineteenth centuries, each cottager had his own small parcel of land which he cultivated, and in addition he had the right of turning his cattle, swine, and geese out to graze on the common land. The Georgian parliaments, consisting mainly of the representatives of the landed class, passed Inclosure Act after Inclosure Act, enclosing as much as 7,000,000 ac. of common land between 1760 and 1867. To compensate the cottagers for their lost grazing rights many of these Acts provided that garden As. should be reserved for them. This benevolent intention seems to have failed in the working, for while between 1845 and 1867 nearly half a million ac. of land were enclosed, only 2119 ac. were set aside for the poor. Alarmed by the rapid decline in the agric. pop. due to the lure of the tns., with their greater opportunities, higher wages, and less monotonous existence, the policy of the nineteenth century was to check the flow towards the tns. by giving the agric. labourer some inducement to remain in the country, so that Acts for the provision of As. and small holdings were almost as numerous as Inclosure Acts in the previous century. Incidentally it was also discovered that the parcelling of land into small holdings was a profitable thing for the landlord, the fork and spade husbandry of the A. being much more effective than the plough. In 1819 and 1831 were passed the first Acts making provision for As., and the series of Acts which followed were consolidated in the Small Holdings and Allotments Act, 1908. Most of these Acts aimed at giving compulsory powers to local authorities, and in some cases laid on them the duty, to provide As. The Parish Councils Act, 1894, gave a stimulus to this matter, and during the first 4 years of its working nearly 15,000 ac. were allotted by the councils to 32,000 tenants. An A. does not

generally exceed in size a quarter of an ac., the underlying idea being that its size should not exceed that which can be cultivated during the spare time of the labourer, but a small holding is the term applied to an agric. holding of from 1 to 50 ac. Additional powers have been conferred on local authorities by various Acts passed since the First World War. Under the Allotments Act of 1919 a co. council may acquire land for leasing to a par. council of A., but the A. may be let only to residents or to persons working on a co-operative system, or let to A. associations. Statutory powers are also given to local authorities to acquire land compulsorily for A., or, with the consent of the Ministry of Agriculture, land held by them for other purposes may be appropriated to A. Under the Act of 1925, the Public Works Loans Commissioners may lend to any 'approved society' (i.e. a society registered under the Industrial and Provident Societies Acts or under the Friendly Societies Acts) money to purchase land for A. Compensation for improvements is provided for by the Allotments Act of 1922, and, in this context, an 'allotment' means any piece of land, whether attached to a cottage or not, of not more than 2 ac., held by a tenant and cultivated as a farm or a garden or as both. For the purposes of the Act of 1925 an 'allotment' includes any piece of land of not more than 5 ac. Every local authority preparing a town-planning scheme must consider what provision ought to be made for reserving land for A. (including allotment gardens, i.e. A. not exceeding 40 poles and wholly or mainly under crops or vegetables for consumption by the cultivator or his family) and must at least once a year consider whether any and if so what lands within the area of the scheme are needed for A. (Act of 1925). By the Act of 1925 a bor. or an urb. dist. council may acquire land for future A. with the approval of the Ministry of Agriculture.

**Allotropy**, the property which some chemical elements possess of existing in different modifications under different circumstances. Sulphur may exist as octahedral or prismatic crystals, or as an amorphous powder, or yet again in a plastic form. Carbon may exist in any of the three forms, diamond, graphite, and amorphous charcoal or lampblack. Phosphorus may exist in red, yellow, or scarlet crystalline modifications. Oxygen is found as the ordinary constituent of air or as the ozone which is produced in the neighbourhood of an electric discharge. In this case, however, it is known that the combination of atoms in the molecule is different, as ozone is one and a half times as dense as oxygen; that is, the formula for oxygen is  $O_2$ , and that of ozone  $O_3$ . A. is not confined to non-metals; thus tin, silver, antimony, arsenic, and other metallic or metalloid elements exist in allotropic forms. A. is explicable on the assumption that the molecules of the different forms are of dissimilar structure.

**Alloway**, on the banks of Doon, 2½ m. S. of Ayr, in the co. of Ayrshire, Scotland, is the bp. of Robert Burns. The cottage in which the poet was b. has now been converted into a museum. Here also is the 'kirk' which he celebrates in *Tam o' Shanter* as the scene of the witches' dance, and the 'Auld Brig' over which Tam o' Shanter escaped.

**Alloxan** ( $C_{12}H_{10}O_8N_2$ ), or mesoxalyl-urea, an important decomposition product of uric acid. It is obtained by oxidising the uric acid with nitric acid. On treatment with alkalis it takes up 2 molecules of water, producing urea and mesoxalic acid.

**Alloxantin**, a substance formed by the reduction of alloxan by dialuric acid, or directly from uric acid by evaporating to dryness with nitric acid. Treated with ammonia, it forms a purplish-red dye, *murexide*, a test for uric acid being thus provided.

**Alloy**, a substance formed by the union of 2 or more metals. There are 3 ways of bringing about this union. The first is the compression of the powdered metals in a steel cylinder, but this does not lend itself to technical application. It is also possible to bring about the deposition of an A. by the electrolysis of a solution of a mixture of 2 metallic salts. The third method, that of the greatest commercial importance, is the fusion of the metals at a temp. high enough to form a uniform liquid. The observation of the temps. during the process of cooling has shown that at certain points the temp. remains constant for a short time, which seems to point to chemical combination taking place at those temps. Some As. therefore may be chemical compounds, definite proportions of the constituents occurring in each molecule, but the great majority of As. are certainly not in a state of chemical combination. Roberts-Austen has shown that metals diffuse in other metals just as a salt dissolves in a liquid, and sometimes at a greater rate. Thus a ball of gold immersed in a bath of molten lead at 550° C. quickly diffuses into every part of the liquid. Those phenomena, combined with the fact that all proportions of the metals may exist within certain limits, have suggested that an A. is analogous to a solution. The microscopic examination of As., however, shows that the different metals arrange themselves in patterns often of a most varied character, but that each metal is quite distinguishable.

Certain physical properties of an A. appear to be a mean of the corresponding properties of its constituents, while other properties are markedly different. The melting-point is usually lower than that of any of its components. This is seen in ordinary plumber's solder, consisting of tin and lead, which melts more easily than either of the metals composing it. Rose's fusible metal, consisting of 1 part of tin, 1 of lead, and 2 of bismuth, melts at 95°, although the lowest melting-point among its constituents is that of tin, viz. 232°.

Many of the As. are used in the arts and manufs. on account of the properties they possess which are wanting in the simple metals. Brass consists of 2 parts of copper and 1 of zinc, is hard and yet can be easily turned. Gun-metal contains 9 parts of copper to 1 of tin and is very tough and hard. Bell-metal contains 2 parts of tin to 8 of copper, and is harder and more sonorous than either of its constituents. Type-metal consists of 65 parts lead, 25 parts antimony, and 10 parts tin, is hard but not brittle, and is easily fusible. Bullets are covered with a hard envelope consisting of an A. of nickel and copper. An A. of 36 per cent of nickel in steel maintains a practically constant vol. through a great range of temp., and one of 43 per cent of nickel in steel possesses the same coefficient of expansion as glass, and therefore can be used instead of platinum for electrical connections through glass. A small quantity (up to 12 per cent) of tungsten alloyed with steel produces an exceedingly hard metal, used for making tools intended for cutting or planing steel.

**Allspice**, the dried flower-buds of *Eugenia caryophyllata*. See **EUGENIA**.

**Allston**, Sir Francis, see **CHANNING**, **BARON**.

**Allston**, **Washington** (1779-1843), Amer. painter and author, was b. at his father's plantation at Waccamaw, S. Carolina. In 1800 he graduated at Harvard, after which he visited London, Paris, and Rome (where he formed friendships with Coleridge and Thorwaldsen), for the purpose of studying art. In 1818 he finally returned to America. His pictures are numerous, the best-known being 'The Dead Man Revived,' 'St. Peter liberated by the Angel,' and his unfinished 'Isolshazzar's Feast.' He pub. a poem, *The Sylphs of the Season*, 1813, a novel, *Monaldi*, 1841, and *Lectures on Art*, 1850. See J. B. Flagg, *Life and Letters of Washington Allston* (New York), 1892.

**All the Talents**, the ministry organised by Lord Grenville in 1806, on the death of William Pitt, and so named in derision by the opposition party.

**All the Year Round**, a weekly periodical, of which Charles Dickens was ed. and which superseded *Household Words*. In it his *Tale of Two Cities* first appeared.

**Alluvion** (Lat. *alluvio*, a washing against), the legal term for land gradually formed by deposit from the sea or some other water. The process must be gradual. A. becomes the property of the owner of the land to which it is attached.

**Alluvium** (Lat. *ad*, towards, *luere*, to wash), or **Alluvial Deposits**, a name given to those accumulations of sand, earth, and loose stones or gravel brought down by streams and rivs. and spread out over lower lands, which are called *alluvial lands*. The term is sometimes also applied to the deposits at the mouth of a riv. entering the sea, when they are known as *marine alluvia* to distinguish them from the *fresh-water alluvia*.

**Allygurh**, see **ALIGARH**.

**Allyl**, an unsaturated organic radicle corresponding to the formula  $\text{CH}_2\text{:CH:CH}_3$ . The chief compounds are: *A. alcohol*, with the general properties of a primary alcohol; *A. iodide*, a colourless liquid with an odour of garlic; *A. bromide*, a heavy liquid obtained by treating *A. alcohol* with phosphorus tribromide; *A. sulphide*, or 'oil of garlic,' obtained by macerating garlic; and *A. isothiocyanate*, or 'oil of mustard,' occurring in black mustard seeds.

**Alma**, a small riv. of Russia, in the Crimea, flowing westward into the Black Sea. On its banks the combined armies of Britain, France, and Turkey defeated the Russians, Sept. 20, 1854.

**Alma-Ata**, cap. of the Kazakh S.S.R., Russian Central Asia, a garden city at the foot of a spur of the Tien-Shan Mts. It has fruit-preserving and textile industries. Pop. 230,000.

**Almacantar**, see **ALMUCANTAR**.

**Almac's**, in the eighteenth century the name of a famous club and suite of assembly rooms, founded about 1764 by one McCall, a Scotchman, of whose name *A.* is an anagram. The club was noted for its aristocratic exclusiveness and high play, and was situated in Pall Mall. From it sprang the still existing Brooks's Club. In 1765 McCall built a suite of assembly rooms in King Street, St. James's, and here balls of still greater exclusiveness were held for some years. In 1781, at McCall's death, they became the property of his niece, Mrs. Willis, and continued as 'Willis's Rooms' till 1890.

**Almada**, a tn. of Portugal in Estremadura, on the Tagus. Wine trade. Pop. 24,000.

**Almadén**, a tn. of Spain, prov. of Ciudad Real, in mountainous country 55 m. S.W. of Ciudad Real, is celebrated for its mercury mines, the most anct. in the world. Pop. 9,000.

**Almagest**, name of an important astronomical and mathematical work of Claudius Ptolemæus, or Ptolemy, one of the most celebrated savants of the Alexandrian school. This work was probably written between A.D. 140 and 150, in the reign of the Rom. Emperor Antoninus Pius, and was divided into 13 sections or 'books.' To distinguish it from other important works of the same author, it received the Gk. appellation *megiste*, 'the greatest,' from which its modern name, with the addition of the Arabic definite article *al*, 'the,' is derived. In it is set forth the theory of the solar system, designated the Ptolemaic system, which held the unchallenged sway in the realm of astronomic science during the Middle Ages that the works of Aristotle did in other branches of knowledge. According to this system the sun revolved around the earth, but the other planets revolved around the sun. The *A.* contained also a catalogue of 1028 stars.

**Almagra** (Arabic), a species of ochre of a dark red colour used as a skin paint and general dye.

**Almagro**, city of La Mancha, Spain,

prov. of Ciudad Real. Situated in a vine-growing dist., where lace-making is also pursued. Pop. 8700.

**Almagro**, Diego de (1475-1538), a Sp. soldier of fortune, said to have been a foundling in the tn. of *A.* In 1524 he joined Pizarro in a scheme for the conquest of Peru. Ultimately the two quarrelled over some ter., and in 1538 Pizarro had him executed.

**Almain**, a word derived from the Alemanni, a people of anct. Gaul, and used to denote Germany. The Fr. words *Allemand* and *Allemagne* are derived from the same source.

**Almali**, or **Elmalu**, tn., Asiatic Turkey, on the R. Myra, 25 m. from its entrance into the Mediterranean. It is situated in a valley of the Massicytus Mts., and has a considerable trade. Pop. 20,000.

**Alma Mater** (Lat., nourishing mother), the name given to a univ. to express its relation to those educated at it—its *alumni* or foster-children.

**Al-Mamun**, or **Abdallah III.**, a caliph of the Abbasid dynasty, was the son of Harun al-Rashid. After a war with his brother Amin, he came to the throne in 813. He rendered his reign illustrious by his encouragement of science and the arts, by his generosity and clemency, and by his own taste for letters. He estab. colleges, and caused the best works of other countries to be trans. into Arabic. Especially did he encourage astronomy, causing a decree of the meridian to be measured on the plains of Shinar. He d. in 833 in a campaign against the Gk. Emperor Theophilus.

**Almanac**, a book or table containing a calendar of the days, weeks, and months of the year, with the addition of notices of astronomical phenomena, of eccles. feasts, and similar useful information. Authoritative *As.* are pub. by the govts. in most countries, and from these the smaller ones are compiled. Such are the *Nautical A.* in Great Britain; the *American Ephemeris and Nautical A.* in the U.S.A.; and the *Almanach de Gotha*, pub. in Germany and France. The Berlin *Astronomisches Jahrbuch* and the Fr. *Connaissance des temps* contain additional astronomical information. These works are pub. some years in advance, and contain tables of the predicted positions of sun, moon, and planets, and of all the fixed stars used in navigation. Statistics of various kinds are also given. The *Almanach de Gotha* contains lists of the statistics of politics, pop., sovereigns, army, etc., for every state. More popular works are *Whitaker's Almanack* in England, containing much information, *Oliver and Boyd's New Edinburgh A.* in Scotland, and *Thom's Irish A.* for Ireland.

The hist. of the *A.* goes far back in the E. Its use is known of from the thirteenth century onward in England. The first printed *A.* is that of Purbach, 1450-61, and this was soon followed by the more important work of Regiomontanus, which covered the years from 1475 to 1531. The early *As.* generally took the name of 'Prognostications,' and



these prophetic As. had a huge circulation among the unlearned. In the reign of James I. the monopoly for their production was granted to the 2 univs. and the Stationers' Company. Of this type of publication are *Old Moore's* and, in America, *Poor Richard's A.* The sale of such works of fiction is now considerably restricted. Partridge, the A. maker of the Stationers' Company, has been immortalised by Dean Swift in the famous *Bickerstaff Papers*, 1708.

**Almandite** or **Almandine**, a variety of garnet, composed of silica, alumina and protoxide of iron, and either deep red in colour and transparent, brownish and translucent, or black (melanite). According to Pliny, it was named after Alabanda, a city of Caria where the mineral was cut and polished.

**Almansa**, a tn. of Murcia, Spain, prov. of Albacete, on Madrid-Alicante railway, has linen, cotton, brandy, and soap manufs. Near this tn. the Fr. under the duke of Berwick defeated the Brit. and Sp. troops on Apr. 25, 1707. Pop. 11,000.

**Almansur** (Arabic, the Victorious), **Abu Jaffar Abdallah** (712-775), second caliph of the Abbasid dynasty, succeeded his brother in 754. He founded Bagdad.

**Alma-Tadema**, **Sir Laurence**, O.M. (1836-1912), of Dutch extraction, was b. at Dronryp, Friesland, on Jan. 8. He studied painting first at the Antwerp academy, and later under Baron Leys. He followed Leys in devoting himself to the reconstruction of the past, painting chiefly classical subjects. About 1870 he settled in London and became a naturalised Englishman. In 1879 he was made a member of the Royal Academy, and he received knighthood in 1899. His work is remarkable for its archaeological accuracy and for his extraordinary power of painting marble. Some of his works are: 'The Education of the Children of Clovis,' 1861; 'Pyrrhic Dance,' 1869; 'The Vintage Festival,' 1876; 'The Seasons,' 1877; 'Roses of Heliogabalus,' 1888. He had the distinction of being one of the artists selected for the Order of Merit. See H. Zimmermann, *L. Alma-Tadema, his Life and Work* (London, 1886; G. Ebers, *L. Alma-Tadema* (trans. New York, 1886).

**Alme**, **Almeb**, or **Al-mal**, i.e. 'the learned,' is the name given by the modern Egyptians and Arabs to the Egyptian singing girls (not to be confused with the ghawāzī or dancing girls) who attend festivals, marriages, funerals, and other ceremonies. They are also found in Syria and other parts of the Ottoman empire.

**Almeida**, a tn. in Portugal, prov. of Beira, near the R. Côa, formerly one of the prin. fortresses of Portugal. In 1762 it was taken by the Spaniards, in 1810 by the Fr. Recovered by the Brit., 1811. Pop. 16,300.

**Almeida-Garrett**, **João Baptista de** (1799-1854), Portuguese poet and politician, b. at Oporto. He took an active part in the political movements of his country. Of his romantic plays *Gil Vicente* is con-

sidered the best national drama of Portugal. His other works include an epic poem called *Dona Branca, Romanceiro*, a collection of Portuguese folk-tales, and *Folhas caídas*, a vol. of lyrics.

**Almeirim**, a tn. of Portugal in the dist. of Santarém, an anct. residence of the kings of Portugal. Pop. 12,700.

**Almelo**, a tn. of Holland on the Vecht, near Deventer. It has linen industries. Pop. 34,000.

**Almería**: 1. Prov. of Spain, E. part of former kingdom of Granada. It is mountainous, with much mineral wealth. Area 3360 sq. m. Pop. 360,000. 2. Cap. of above prov., Mediterranean port 104 m. E. of Malaga, has good harbour defended by forts. It is an anct. city, very Saracenic in appearance. Exports fruit of various kinds, iron-ore, lead, etc. It was bombarded on May 31, 1937, during the Sp. Civil war, by Ger. warships as a reprisal for a Republican attack on the Ger. ship *Deutschland* near the Balearic Is. when 23 of the crew were killed and 83 wounded. Pop. 56,000.

**Almissa**, a dist. of Yugoslavia. The grape is the chief product of the country. Pirates formerly infested the coast. Pop. about 1700.

**Almodovar del Campo**, tn. of New Castile, Spain, prov. of Ciudad Real, centre of agric. dist., once a Moorish fortress. Pop. 7000.

**Almogia**, a tn. of Spain in the prov. of Malaga, with about 2500 inhab. Vines, figs, raisins, and other fruits are plentiful.

**Almohades**, a Berber dynasty that ruled N. Africa and the Moslem half of Spain during the twelfth and thirteenth centuries. The founder of the dynasty and the cult (the name, lit. *Al-muwahhidun*, means Unitarians—those laying particular stress on the unity of God, as opposed to the current anthropomorphism) was Mohammed ibn Tumart. He, with his lieutenant and successor, Abd-el-Mumin, dethroned the Almoravido dynasty (q.v.) and conquered N. Africa. The dynasty was fanatical and purely military, yet it retained its power intact until 1212, when its decline began in the defeat of Navas de Tolosa. The line ended in 1269.

**Almon**, the name of an affluent of the Tiber in anct. Latium, where those who sacrificed to Cybele purified themselves, and where every year the image of the goddess was laved.

**Almon, John** (1737-1805), a London bookseller and pamphleteer, was b. at Liverpool. His business premises were in Piccadilly. Among his publications were the *Parliamentary Register*, 1774, and the *General Advertiser*, 1784. In 1785 the Crown moved to try him for publishing the pamphlet *Juries and Libels*, but the prosecution failed. For merely selling a copy of the *London Museum* containing Junius's 'Letter to the King' he was fined and bound over (1770). His great friend was John Wilkes, whose correspondence he pub. with a memoir (1805).

**Almond** is a name applied to sev.

plants of different orders. The common A. is a species of *Prunus* (subgenus *Amygdalus*), and is known as *A. communis* or *P. Amygdalus*; it is grown in England for its pink flowers. It yields an oil, and the seeds are eaten as dessert. The tree is believed to be indigenous to W. Asia and N. Africa, but it has been very widely distributed over the warm temperate region of the Old World.

**Almond**, a trib. of the Tay, flowing into that riv. 2 m. above Perth. Most of its course is in Perthshire.

**Almondbury**, a vil. and par. of the W. Riding of Yorkshire, near Huddersfield, and 3½ m. S.W. of York. It has cotton and woollen mills. Pop. 8,300.

**Almonds**, Oil of, a substance squeezed out of the kernels of the A. tree. That produced from sweet As. contains a fixed oil, a glyceryl oleate, which is often used as a substitute for olive oil. Oil of bitter As. contains amygdalin, which in contact with water gradually undergoes decomposition into benzaldehyde, hydrocyanic acid, and dextrose. Benzaldehyde is often called 'oil of bitter As.', and is used for flavouring purposes and in the manuf. of various dyes.

**Almoner** (O.Fr. *almosnier*, Lat. *elemosynarius*), originally the officer of a religious house appointed to distribute to the poor the alms of the house, one-tenth of the revenue. Bishops and sovereigns also had As. In England the lord high A., usually a bishop, distributes, twice a year, the sovereign's bounty.

**Almonte**, a tn. in the prov. of Ontario, Canada, and a centre for the manuf. of woollen goods. Pop. 2,400.

**Almora**, tn. and dist. of the N.W. Provs. of India, Kumaon div. The tn. situated more than 5000 ft. above sea-level, was taken by the Brit. in 1815. Pop. of tn. 8000.

**Almoravides**, a Berber dynasty which ruled over Morocco and part of Spain during the eleventh and twelfth centuries. The line was founded by Abdallah ibn Yaseen, who about 1050 preached a holy war. Aided by his brother Abu Bakr, he conquered most of Morocco. On his death he was succeeded by Yusuf ibn Tashfin, who completed the conquest of Morocco and extended his power into Spain in 1086. He defeated the Christians at Sacrallas, but was then obliged to return to Africa. In 1090, however, he returned and took the complete control of Mohammedan Spain. The dynasty was supplanted in 1147 by the Almohades (v.v.).

**Almqvist**, Carl Jonas Love (1793-1866), Swedish author, was b. at Stockholm and d. at Bremen. He gave up good prospects to found a 'natural life' community in Wernmland. He soon relinquished this plan and took to school-teaching. In 1832 his true literary career began with the first of his series of romances, called *The Book of the Thorn-rose*. His succeeding works, lyrics, dramas, philosophical, æsthetic, moral, and educational works, show re-

markable versatility. In 1851 he fled to America, convicted of forgery and charged with murder. Later he returned to Bremen, where he lived under the name of C. Westermann till his death.

**Almshouse**, a house built and endowed for the support of those disabled from work by age or poverty. The most ancient example is the hospital of St. Cross, Winchester. The name 'hospital' is also used for As. in Scotland. In 1853 charity commissioners were appointed to put down the many abuses of the system.

**Almucantar**, a scientific apparatus consisting of a telescope borne on a float in a tank of mercury. The path of the float is a horizontal circle passing through the pole of the heavens. Clock connections are made by calculating the different azimuths cut by the transits of the stars. The instrument also gives the ascensions and declinations of the heavenly bodies.

**Almuñecar**, seaport of Spain (Andalusia), prov. of Granada, on the Mediterranean, a quaint city with many Moorish remains; pop. 4100.

**Alnus**, a genus of plants of the order Betulaceæ which grow in a temperate climate. *A. glutinosa* is the common or black alder, so called from the very dark hue of its bark. It inhabits swamps and meadows of Europe, the N. of Africa, Asia, and America; it is extremely common in Britain. It is not a very large tree, varying in height from 30 to 60 ft. The leaves are a rough oval, with serrated, or toothed, edges, and the flowers form small female catkins resembling cones and pendulous male catkins. The bark is valuable for tanning, while the young shoots dye various colours, particularly red and brown. The tree is not of much value as firewood, but it furnishes an excellent charcoal, second only to that of the black dogwood. The wood is extremely useful, being capable of enduring long immersion in water, and next to metal is the best material for water-pipes and underground purposes. Cabinet-makers employ it in the manuf. of what is known as Scottish mahogany.

Other species of A. are *A. incana*, the Turkey or upland alder, which is found all over continental Europe, and is noted for its non-glutinous leaves; *A. cordifolia*, the heart-leaved alder, which is a native of Naples; and *A. viridis*, the green alder, an inhab. of Central America.

**Alnwick**, on the Aine, cap. of the co. of Northumberland, England, 32 m. N.W. of Newcastle. It is a well-built tn. and contains interesting remains, such as those of its old tn. wall and various abbeys. Pop. 6900.

**Aloe**, a genus of succulent shrubs or trees of the order Liliaceæ, natives of the Cape of Good Hope and the is. of Socotra. The best As. grow on the *A. socotrina*, from the fleshy leaves of which plant the drug is obtained. The drug known as As. is bitter in taste, and procured from the inspissated juice of the leaves of many species of A. The finest sort, the Socotrine As., have their chief

sources in *A. lucida* and *A. perryi*; the very coarse *A. caballina*, or horse As., are used only in veterinary practice. The chief principle of As. is aloin ( $C_{12}H_{18}O_6$ ), which is a powerful cathartic, its chief action being on the rectum. It is also an emmenagogue and anthelmintic.

**Aloes Wood**, also known as Agila Wood, Agallochum, Eagle Wood, Paradise Wood, and Calambac, is the heartwood of *Aquilaria orata* and *A. agallocha*, found in tropical Asia. The innermost wood of these trees yields a fragrant resinous substance which is used in the E. as a perfume and as a medicine. It retains its fragrance for years, and was once more valuable than gold. It is thought to be the A. mentioned in the Bible.

**Aloides**, Otus and Ephialtes, according to the anc. Gk. legend the twin sons of Poseidon and Iphimedia, wife of Aloeus. They made war upon the gods, and in order to force an entrance piled Mt. Pelion on Ossa. They were defeated by the immortals, and their fate became a standing warning to insolent mortals.

**Along**, a magnificent bay in Annam, Indo-China, and offering a splendid shelter to ships. In the neighbourhood are famous coal-mines.

**Alonso**, see ALFONSO.

**Alopecia** (Gk. ἀλωπῆς, fox), the total or partial falling out of the hair, obtaining its name from the fact that foxes are subject to a disease which destroys their hair. See BALDNESS.

**Alopecurus**, a genus belonging to the Gramineæ, or grasses. *A. pratensis*, the meadow foxtail grass, grows abundantly in Britain, providing a rather coarse but valuable pasturage for cattle.

**Alora**, a tn. of Spain in the prov. of Málaga. It is the centre of a very fertile fruit-growing dist., and is famous for its 'Manzanilla olives.' Its mineral springs are much frequented. At A. are some fine medieval relics. Pop. 11,450.

**Alose**, or **Alice** (*Alosa commutis*), is the shad found in Europe. It belongs to the family Clupeidae, and is closely related to the herrings, anchovies, and pilchards.

**Alost**, or **Aalst**, tn. of Belgium in E. Flanders, on the R. Dender, here made into a canal. It contains the church of St. Martin, and manufs. lace and textiles. Pop. 42,000.

**Aloysia**, a genus of Verbenaceæ, common in America. The Brit. lemon verbena is *A. (or Lippia) citriodora*.

**Aloysius**, St., see GONZAGA, LUIGI.

**Alpaca**, a domesticated breed of cameloid mammals, derived from the wild guanaco. It is smaller than the llama, and is not, like that animal, used as a beast of burden. As. are kept in large flocks in the Peruvian Andes, and their wool is shorn annually. The wool varies in colour from black to dark yellow, and is lustrous, silky, and fine. It has been used by the Indians for cloth from time immemorial, but it was not properly introduced into England till 1836. The name of Sir Titus Salt is historic in its connection with the establishment of alpaca factories.

**Alp Arslan** (Valiant Lion), second Persian sultan of the Seljuk dynasty (1029-72). On embracing the Mohammedan faith, he took the name Mahomed ibn Daoud, to which his surname was afterwards added. His vizier, Nizam-al-Mulk, assisted him ably and founded many colleges throughout the kingdom. He came to the Persian throne in 1063, and pursued a career of conquest. He reduced Armenia and Georgia, and later won a great victory over the emperor of Constantinople, Romanus Diogenes, whom he took prisoner, but treated with great generosity. The sultan was assassinated by a prisoner whom he had condemned to death.

**Alpena**, city of A. co., Michigan, U.S.A., on Thunder Bay, at the mouth of Thunder Bay R., on the Detroit and Mackinac railroad. The city is a summer resort, and has good fisheries and tanneries, besides exporting lumber. Pop. 12,000.

**Alpenhorn**, or **Alphorn**, musical instrument used chiefly by the Swiss mountaineers to convey signals. It consists of a curved wooden horn with cup-shaped mouthpiece. The notes are the natural harmonics of the open tube.

**Alpes, Basses**-, a dept. in the S.E. of France on It. frontier, bounded on the N. by Hautes-Alpes, on the E. by Italy and Alpes Maritimes, on the S. by Var. It is drained chiefly by the Durance and its tribs. The surface is generally sterile and mountainous, but the valleys are fertile. Chief tn. Digne. Area 2685 sq. m.; pop. 83,000.

**Alpes, Hautes**-, a dept. in the S.E. of France, N. of Basses-Alpes. The dept. is mountainous throughout (chief peak Les Ecrins, 13,500 ft.), and is drained chiefly by the Durance. It is thickly wooded and has some mineral wealth. Cap., Gap. Area 2178 sq. m.; pop. 81,000.

**Alpes-Maritimes**, a dept. in the S.E. of France, bounded on the S. by the Mediterranean and separated from Italy on the N. and E. by the Maritime Alps. It is watered by the Var and its tribs. The climate, salubrious throughout, is particularly mild in the S., where are the well-known health resorts of Nice (the cap.), Cannes, Mentone, and Antibes. The olive, orange, lemon, mulberry, and citron flourish, whence the silk and oil industries are considerable. Tobacco is also raised. Another source of income is the exportation of flowers to be used in the manuf. of perfumes. Area 1450 sq. m.; pop. 448,000.

**Alph**, the imaginary 'sacred river' where Coleridge's Kubla Khan built his stately pleasure dome. The poet places the riv. in Xanadu, a genuine dis.

**Alpha and Omega**, written A and Ω, first and last letters of the Gk. alphabet. God, as being the beginning and end of all things, calls Himself in the Bible A. and Ω. The words are applied in general to the sum total or true essence of a thing.

**Alphabet**, from *alpha* and *beta*, the names of the first two letters of the Gk. A. The A. is the last, the most highly developed, the most convenient, and the most easily adaptable system of writing (see WRITING). It is a collection of a small number (generally between 20 and 30) of symbols called letters, intended to represent the various sounds used by the human voice in speech. Perfection has not yet been reached by any A., although this end does not perhaps seem very difficult of achievement. Perfection in an A. implies the accurate rendering of speech-sounds; each sound must be represented by a single constant symbol, and not more than one sound by the same symbol. As it is, all As. omit symbols for some sounds, representing these, when necessary, by combinations of other symbols, by the addition of diacritical points or other marks, and so forth, while, on the other hand, most of the As. contain redundant letters. An interesting instance in this connection is the representation of the sounds *sh* and *ch* (as in 'church') in various languages; while the Russian A. has a single symbol for the combination *sch*, Czech (another Slavonic language) would use for it the combination *šč*, Polish (again a Slavonic speech) represents it by four consonants (*szcz*)—and so does Eng. (the four consonants are *schk*, as in 'Ashchurch')—and Ger. would need as many as seven consonants for the transliteration of this combination, that is *schtsch*. Eng. has no single symbols to represent the sounds *ch*, *sh*, *th*, and so forth. On the other hand, some letters are used for two or more distinct sounds; in Eng., for instance, the letter *c* is sounded hard (=k) as in 'cross' and 'cursive', and soft (=s) as in 'precise' and 'cell', in addition to entering into the combination *ch*, and replacing the *k* in *ck*. Again, *q* and *x* are redundant; *q* only appears in the combination *qu*, and can always be represented by *kwo*; and *x* can always be represented by *ks*.

Alphabetic writing is now universally employed by civilised peoples, and no other system of writing has had so extensive, so intricate, and so interesting a hist. The story of the A. from the end of the second millennium B.C. until to-day, is, on the whole, not very hard to trace, though many details, and the origin of some individual As., are still uncertain. It is the pre- and proto-hist. of the A. that is still wrapped in obscurity, and the prin. problem—that of its origin—is still unsolved. Since classic times this problem has been a matter of serious study. The Gks. and Roms. held five conflicting opinions as to who were the inventors of the A.: the Phenicians, the Egyptians, the Assyrians, the Cretans, or the Hebs. In modern times, various theories, some not very different in part from those of ant. days, have been current. Some theories need not be seriously treated (such as that of the Nazi pseudo-scholars), as they are influenced by political considerations. The earliest modern view was that Egypt was the starting-place of

the A. The Egyptian theory has been subdivided into three theories—the hieroglyphic, the hieratic, and the demotic. The Egyptian view was revived in 1916 by Dr. (now Sir) Alan Gardiner and Prof. Sethe, dealing with the early Sinaitic inscriptions (q.v.). Many scholars hold the opinion that in the Sinaitic inscriptions we have to do with a stage of writing intermediate between Egyptian hieroglyphics and the Semitic A. This theory cannot be upheld, although it may be agreed that we have in the early Sinaitic inscriptions one of the earliest known attempts at alphabetic writing.

The attempts made to show that the cuneiform (q.v.) scripts, either the Sumerian or the Babylonian, or the Assyrian; or else the syllabary of Cyprus (q.v.), or the Hittite (q.v.) hieroglyphics, are the true parents of the A., may be regarded as even less successful. The Cretan theory, suggested by Sir Arthur Evans, had recently many adherents. It is certainly true that many alphabetic signs have a resemblance to Cretan linear characters, but the similarity is only external. The same may be said about the theory, developed by Sir W. M. Flinders Petrie, that the A. descended from the geometric prehistoric marks employed throughout the Mediterranean area from the earliest times. Most unlikely is also Sir John Evans's suggestion that the letters were once pictures used as ideograms.

The solution of the problem may come from Palestine, where, since 1929, various late Bronze Age inscriptions (seventeenth to thirteenth centuries B.C.) have been discovered, mainly at Lachish (q.v.). According to many eminent scholars, the writing of these inscriptions, termed early Canaanite (q.v.), constitutes an important missing link in the hist. of our A., representing the long-sought intermediate stage between the early Sinaitic and the earliest known N. Semitic forms. It is, however, possible that the early Canaanite script represents another effort of the second millennium B.C. to introduce an alphabetic writing. Similar efforts were probably: the cuneiform A. of Ras Shamra (q.v.), the anct. Ugarit; the pseudo-hieroglyphic syllabary of Byblos (q.v.), recently deciphered by the Fr. scholar Dhorme; and the scripts of a few enigmatic inscriptions of N. Egypt, of Balua' (Moab, Transjordan), and of the so-called proto-Arabic inscriptions found at Ur (Mesopotamia).

The prototype of the A. was not very different from that of the earliest N. Semitic inscriptions now extant, belonging to the last centuries of the second millennium B.C. These inscriptions were discovered, since 1923, at Byblos, and other places in Syria; also the Gezer (q.v.) 'calendar', belonging to the eleventh century B.C., and the Stone of Moshah (q.v.) or the Moabite Stone, belonging to the ninth century B.C., are written in the same character.

It is usually believed by scholars that practically all existing As. have a common origin, being descended from a Semitic

one, probably from the N. Semitic A. The known facts about this original N. Semitic A. may be summarised thus: it was used by the Syro-Palestinian Semitic peoples in the last centuries of the second millennium B.C. and during the first millennium. It consisted of 22 letters, which correspond roughly to the first 22 letters of the Gk. A., but all the Semitic letters expressed consonants only, and the method of writing was uniformly from right to left. The order, the names, and the phonetic values of the early Semitic letters are preserved in the modern Heb. A. At the end of the second millennium B.C. or at the beginning of the first millennium, with the definite or temporary decay of the great nations of the Bronze Age (the Egyptians, the Babylonians, the Assyrians, the Hittites, the Cretans), we enter a new historical world, in which Israel, Phœnicia, Aram, the Gks., and the S. Arabians played an increasingly important part. These conditions favoured the development of four main branches of the A.: the Canaanite, the Aramaic, the S. Semitic, and the Gk.

The Canaanite main branch may be subdivided into the two following branches: (1) Pre-exilic or Early Heb. (employed by anc. Israel, in the first half of the first millennium B.C.), with its three secondary branches, the Moabite, the Edomite, and the Ammonite, and its two offshoots, the Samaritan and the script of the Jewish coins; (2) Phœnician, which can be distinguished into Early Phœnician, Phœnician proper, and colonial Phœnician, out of which the Punic or Carthaginian, and neo-Punic, and probably also the Libyan and Iberian scripts developed. All the alphabetic scripts W. of Syria seem to have derived, directly or indirectly, from the Canaanite branch, whereas the hundreds of alphabetic writings of the E. apparently sprang from the Aramaic branch. The Aramaic A. probably originated in the tenth century B.C., but the earliest Aramaic inscriptions belong to the ninth to seventh centuries B.C. In the second half of the first millennium B.C., Aramaic became by far the most important and widespread script of the whole Near E. The direct and indirect descendants of the Aramaic A. can be divided into two groups: (1) the scripts employed for Semitic languages, of which six separate centres of development may be discerned, Heb., Nabataean-Sinaitic-Arabic, Palmyrene, Syrian-Nestorian, Mandæan, and Manichaean; the most important of them being Heb., in which the holy scriptures of the Jews are printed and the scrolls of the law are inscribed, and the Arabic A., which is after our own the most generally used in the world to-day; (2) the scripts adapted to non-Semitic tongues of central, S., and S.E. Asia, which can be divided into eight main groups: Kharoshthi, Persian or Iranian (including the Avesta A.), Sogdian, Kōk Turki and Early Hungarian, Uighur, Mongolian (including Kalmyk, Buriat, and the allied Manchu A.), Armenian-Georgian-Alban., as well as Brahmi, the mother-A. of the Indian and

Further Indian main branches. Indian writing and its origin constitute a story in themselves, and so do other branches, such as Iranian or Pahlavi, Mongolian, and especially Armenian, Georgian, and Alban. The S. Semitic group of As. remained mainly confined within Arabia, although a secondary branch spread westwards, and became the progenitor of the Ethiopic A., which through its offshoot, the Amharic script, is the only S. Semitic script still in use, and the only one in which a literature has been produced.

The earliest existing Gk. records in alphabetic writing go back to the eighth century B.C., but the introduction of the A. into Greece was doubtless much older than this. Between the two extreme views, that which assigns the invention of the Gk. A. to the fifteenth century B.C., and that which places it in the seventh or eighth century B.C., each century has its own advocates. Until recently, the date usually preferred was the ninth century; nowadays, an earlier date, such as the tenth or eleventh century, is commonly preferred. The Gks. had many local As.; many little states had each its own variant, and it was long before anything like uniformity was introduced. Indeed, only by the middle of the fourth century B.C. had all the local As. disappeared in favour of the Ionic, which thus became the common, classical Gk. A. of 24 letters. The Gks. made a few important changes, the most remarkable of them being: (1) the introduction of vowel-representation, consisting in the allocation of certain Semitic consonants to Gk. vowel-sounds; (2) the addition of certain letters for the representation of sounds not expressed by any of the Semitic letters, such as *ph*, *ps*, *kh*, and *x*; and (3) the different arrangements of the sibilants. Like the Semitic As., the earliest Gk. A. was written from right to left, a style which was later superseded by the *boustrophedon* direction of writing, that is alternately from right to left and from left to right, as the ox draws the plough, but c. 500 B.C. the method of writing from left to right was generally adopted. In the course of its long hist. the Gk. A. produced the following offshoots: the Asiatic As. (Lycian, Phrygian, Pamphylian, Lydian, and Carian), the Coptic A., with its Nubian derivative, the Messapian A. (in S. Italy), the Gothic A., invented in the fourth century by the Gothic bishop Wulfila, the two early Slavonic As. (Cyrillic and Glagolitic), with their descendants (Russian, Bulgarian, Serbian, Ukrainian, White Russian, and Old Rumanian), later adapted to numerous non-Slavonic languages, and the three Albanian As., which had very little, and only local, importance. However, the main importance of the Gk. A. lies in the fact that through its chief (direct or indirect) descendants, the Etruscan and Lat. As., and the aforementioned Cyrillic A., it has become the prototype of all the European As.

It is commonly believed that the Rom. character was directly derived from the

MODERN HEBREW	NORTH SEMITIC OR PHENICIAN	EARLY HEBREW	EARLY GREEK	ETRUSCAN	EARLY LATIN	GREEK (CLASSIC)	RUSSIAN	LATIN (CLASSIC)	IRISH	GERMAN (BLACK LETTER)	ROMAN (ENGLISH)
א	𐤀	𐤁	Α	Α	Α	Α α	А а	A	Δ Δ	Ɑ α	A a
ב	𐤂	𐤃	Β	Β	Β	Β β	Б б	B	ϐ ϐ	Ɱ б	B b
ג	𐤄	𐤅	Γ	Γ	Γ	Γ γ(g)	Г г(g)	C	Ϙ Ϙ	Ɱ c	C c
ד	𐤆	𐤇	Δ	Δ	Δ	Δ δ	Д д	D	Ϙ Ϙ	Ɱ d	D d
ה	𐤈	𐤉	Ε	Ε	Ε	Ε ε (ē)	Е е	E	Ϙ Ϙ	Ɱ e	E e
ו	𐤊	𐤋	Ζ	Ζ	Ζ	Ζ ζ	Ф ф	F	Ϙ Ϙ	Ɱ f	F f
ז	𐤌	𐤍	Ζ	Ζ	Ζ	Ζ ζ	З з	G	Ϙ Ϙ	Ɱ g	G g
ח	𐤎	𐤏	Η	Η	Η	Η η(ē)	И и	H	Ϙ Ϙ	Ɱ h	H h
ט	𐤐	𐤑	Θ	Θ	Θ	Θ θ	И и	I	Ϙ Ϙ	Ɱ i	I i
י	𐤒	𐤓	Ι	Ι	Ι	Ι ι	К к	K	Ϙ Ϙ	Ɱ k	K k
כ	𐤔	𐤕	Κ	Κ	Κ	Κ κ	Л л	L	Ϙ Ϙ	Ɱ l	L l
ל	𐤖	𐤗	Λ	Λ	Λ	Λ λ	М м	M	Ϙ Ϙ	Ɱ m	M m
מ	𐤘	𐤙	Μ	Μ	Μ	Μ μ	Н н	N	Ϙ Ϙ	Ɱ n	N n
נ	𐤚	𐤛	Ν	Ν	Ν	Ν ν	О о	O	Ϙ Ϙ	Ɱ o	O o
ס	𐤜	𐤝	Ξ	Ξ	Ξ	Ξ ξ	П п	P	Ϙ Ϙ	Ɱ p	P p
ע	𐤞	𐤟	Π	Π	Π	Π π	Q	Q	Ϙ Ϙ	Ɱ q	Q q
פ	𐤠	𐤡	Ρ	Ρ	Ρ	Ρ ρ	Р р	R	Ϙ Ϙ	Ɱ r	R r
צ	𐤢	𐤣	Σ	Σ	Σ	Σ σς	С с	S	Ϙ Ϙ	Ɱ s	S s
ק	𐤤	𐤥	Τ	Τ	Τ	Τ τ	Т т	T	Ϙ Ϙ	Ɱ t	T t
ר	𐤦	𐤧	Υ	Υ	Υ	Υ υ	У у(u)	V	Ϙ Ϙ	Ɱ u	U u
ש	𐤨	𐤩	Φ	Φ	Φ	Φ φ(f)	В в		Ϙ Ϙ	Ɱ v	V v
ת	𐤬	𐤭	Ψ	Ψ	Ψ	Ψ ψ	Ω ω	Z	Ϙ Ϙ	Ɱ z	Z z

The first column contains the Modern Hebrew script, which phonetically corresponds with the Early Semitic alphabets (columns 2-3). These and the alphabets of the next three columns contain a few letters which have not passed to the other alphabetic systems or have changed their phonetic values. These letters are drawn in smaller type in the upper part of the square, in their alphabetical order.

*Russian.*—The following Russian letters have no exact equivalent in the Rom. alphabet or they are placed in different alphabetic position. В, meaning V (between B and G, which in the Russian alphabetic order takes the place of C), Жж, И, and Йй, variants of I or Y, Цц, Чч, Шш, Щш, Ъъ, Ыы, Ээ, Юю, Яя, Фе, Yr.

*Modern Hebrew.*—The Hebrew letters K, M, N, P, and S have also final forms, drawn on the left.

Gk.; this theory is unlikely: the Etruscan A. seems to have been the link between the Gk. and the Lat. The Etruscans, a people of uncertain origin and ethnic and linguistic affinities, were the leading power in Italy in the first half of the first millennium B.C. They gave their name to Tuscany and the Tyrrhenian Sea (the Romans called them *Etrusci*, and the Gks. knew them as *Tyrsenoi* or *Tyrrhenoi*). The probable date of the introduction of the A. into Etruria is the eighth century B.C., but only c. 400 B.C. did the classical Etruscan A. take its final form, having 20 letters, that is 4 vowels and 16 consonants. The following were the main offshoots of the Etruscan A.: the Picenian A. (on the It. Adriatic coast), the Venetic A. (in the modern Venetian region), the N. Etruscan or Alpine As., and various Italic As. (Oscan, Umbrian, Siculan, Faliscan, and especially Lat.). The origin of the Runes, the 'national' writing of the Teutons, especially of the N. Germanic peoples, offers many difficult problems. The most probable theory is that recently suggested and already accepted by many eminent scholars, that the Runes were derived from a N. Etruscan A., and were invented in the second or first century B.C. There were many local and chronological varieties, the following being the most important: Early or Common Teutonic or Primitive Norse (used mainly from the third to eighth centuries A.D.), the A.-S. or Anglian Runes (employed in England for about five centuries), and the Nordic or Scandinavian varieties (from about A.D. 800). The gradual displacement of the Runes by the Rom. character coincided with the introduction of Christianity and its increasing influence, but in some parts of Scandinavia the Runic scripts lingered on (in limited use, for charms, for instance) as late as the sixteenth or even the seventeenth century. The origin of the Oghamic A.—employed by the Celtic pop. of the Brit. Isles, particularly in S. Ireland and Wales, Isle of Man and Scotland—is still obscure. It seems to have been invented in the fourth century A.D., and mainly used as a cryptic script. The variety which was employed in W. Scotland is now known as Pictish Oghams.

The oldest existing records written in the Lat. or Rom. A. date from the seventh century B.C., but on the whole the Lat. inscriptions belonging to the seventh to second centuries B.C. are relatively few in number. The earliest inscriptions run from right to left, or vertically in *boustrophedon* style. Only from the first century B.C. onwards do they become so numerous all over the world that they cannot be counted. The Romans adopted 21 of the original 26 Etruscan letters, and at the same time varied the symbols a little. Their early A., therefore, ran thus: A B C (having the sound *g* or *k*) D E F Z H I K L M N O P Q R S T V X. At a later time Z was dropped, but a new letter was invented (consisting in the addition of a bar to the lower end of C, thus converting it into

G) to denote the voiced sound *g*, and was placed in the position previously occupied by *zeta*. In the first century B.C. the Gk. letters Y and Z were adopted (for the transliteration of Gk. sounds) and placed at the end of the A. Thus the classical Lat. A. became one of 23 letters. The only permanent additions of the Middle Ages were the signs J U W. J is *i* used as a consonant; U is a variant of V, which has secured separate recognition, U being used for the vowel-sound *u* to distinguish it from the consonantal *v*, for which V is employed; and W is *oo*, or double *uu* (UU—VV).

The Eng. A. is, strictly speaking, the adaptation of the Lat. A. to the A.-S. form of speech. (Also the other modern European As., with a few exceptions, are adaptations of the Lat. A. to Romance, Teutonic, Slavonic, and Finno-Ugric languages.) To the A.-S. A., however, three new letters were added, one of which, for the sound *th*, was borrowed from the Runes. Later the influence of the Normans caused these to be discarded. The vowels of the Eng. A. are like those of the Lat. A., but the sounds which they represent are very different (see SPELLING). The 'Gothic' A., known as black letter, a medieval variant of the Lat. A., employed in N.W. Europe, including England, until the sixteenth century, is still used in Germany. The modern Irish A. (known also as Gaelic or Celtic), consisting of 18 letters, 5 vowels, and 13 consonants, is a development of the Irish hand of the Lat. A., which is considered by some scholars as having been introduced from Gaul by St. Patrick, and was already used in Ireland in the sixth century.

The evolution of the A. and some specimens of modern As. is illustrated in the diagram opposite.

See I. Taylor, *The Alphabet* (2 vols.), 1883; H. Jensen, *Geschichte der Schrift*, 1925; F. Bodmer (ed. L. Hogben), *The Loom of Language*, 1943; A. C. Moorhouse, *Writing and the Alphabet*, 1946; D. Diringer, *The Alphabet, a Key to the History of Mankind*, 1948. See also bibliography to PALÆOGRAPHY and WRITING.

**Alpha Particles**, the positively charged particles of the alpha rays emitted from radioactive substances. Their velocity is several thousand feet per sec. or about one-twentieth that of light and they cause scintillations of light on impact with a phosphorescent substance. They are evidently atoms of helium which have lost their 2 outer electrons. A. Ps. are detected and measured by the ionisation they produce in a gas. See under RADIOACTIVITY.

**Alphege, St.**, an Eng. saint of the tenth century. Entered a monastery at Bath, and, in 984 was made bishop of Winchester. In 1006 he became archbishop of Canterbury. Martyred at Greenwich by the Danes in 1012. His tomb is in Canterbury Cathedral. The par. church of Greenwich is dedicated to him.

**Alpheus**, see RUPHEA.

**Alphonsine Tables**, an astronomical

work compiled by a body of celebrated Arabian, Christian, and Jewish astronomers in the reign of Alphonso X., the Wise, of Castile. They were completed in 1252, and first printed in 1483.

Alphonso, see ALFONSO.

Alphonsus, St., see LIGUORI.

Alphorn, see ALPENHORN.

Alpine Club, a society formed in 1857-58, united for the purpose of studying mountaineering, not only in the Alps, but throughout the world. It has been followed by many similar organisations throughout Europe and in the U.S.A. It commenced A. literature in 1859 with the publication of *Peaks, Passes, and Glaciers*. In 1863 it began to publish the *Alpine Journal*. The literature thus begun has grown to enormous dimensions.

Alpine Glow, the beautiful effect on the summits of certain A. peaks produced by rays of the rising and setting sun. The glow precedes the sunrise and succeeds the sunset.

Alpine Plants are those which grow in high altitudes, as on mts. which at a greater level bear perpetual snow. They are xerophytic plants, their conditions giving them a low degree of transpiration, and they exhibit most of the characteristics of Arctic plants. The flowers are more brightly coloured than those growing in lower regions, the roots are large, and the leaves frequently hairy, and often exist for long periods covered with snow; in themselves the plants are small and tufted. Most of the flowers are self-pollinated, owing to the scarcity of insects, though moths and butterflies are found at some high levels, e.g. the Alps, and vegetative reproduction is common. A. P. are generally shrubs and herbaceous plants. The most numerous of these are the various saxifrages, the edelweiss, rhododendron, campons, lady's mantle, violas, and primulas. There is naturally considerable variety among the flowers, as they live on damp or on rocky soil, and on damp soil such lower plants as mosses and liverworts abound. See A. F. W. Schimper, *Plant Geography*, trans. 1903. E. A. N. Arber, *Plant Life in Alpine Switzerland*, 1910; H. S. Thompson, *Alpine Plants of Europe*, 1911.

Alpini, Prospero (Prosper Alpinus) (1553-1617), a Venetian botanist, b. at Marostica. He studied at Padua, and became prof. of botany there. He did much valuable botanical research in Egypt. His chief works are: *De Plantis Egypti*, *De Medicina Egyptiorum*, and *De Medicina Methodica*.

Alpinia is a sub-tropical genus of Zingiberaceæ found in Asia and Australia. *A. galanga* yields a kind of arrowroot and galangale, which is largely used in the E., in the place of ginger.

Alpnach, or Alpnacht, a vil. of Switzerland, canton of Unterwalden on Lake A. (an arm of Lake Lucerne). It is notable for the now disused *Slide*, a wooden construction by which timber was sent down from Mt. Pilatus. Pop. 1700.

Alps (probably derived from a Celtic

word meaning 'high,' or connected with Lat. *albus*, white), a massive mt. range covering an area of over 80,000 sq. m., extending from the Mediterranean to the Danube, a distance of some 600 m. The width of the ranges varies from 80 to 150 m. It is the most extensive mt. system of Europe, forming, in fact, its backbone. Its length is cut up by valleys in all directions, and many of its component ranges run parallel, as in the Central A., or obliquely, as in the W. From very ant. times the div. of the A. has been threefold: the W. A., extending northward from the Mediterranean to Mont Blanc; the Central A., from Mont Blanc to the Brenner Pass; the E. A., from the Brenner Pass to the Hungarian plains.

I. The W. A. comprise the following prin. ranges: (1) The Maritime A., generally of no great height, but extremely broken and irregular. (2) The Cottian A., containing sev. peaks over 12,000 ft. high. The small group of Oisans to the W. of this contains the Pic des Ecrins (13,162 ft.). (3) The Graian A., generally higher than the Cottian, which attain in Mont Paradis a height of 13,300 ft. II. The Central A. are generally subdivided into a N. and a S. chain, running fairly parallel. They comprise many groups, of which the chief are the Bernese A. in the N. chain, and in the S. the Pennine, Lepontine, and Rhaetian A. It is here, in the neighbourhood of Mont Blanc, that the A. reach their greatest elevation and that the best-known peaks occur. In the Bernese A. we have Finsteraarhorn (14,026 ft.), Jungfrau (13,671 ft.), Monch (13,465 ft.), Eiger (13,040 ft.), Schreckhorn (13,385 ft.), and Wetterhorn (12,150 ft.). The Pennine A. contain Mont Blanc (15,732 ft.), Monte Rosa (15,151 ft.), Weisshorn (14,803 ft.), Breithorn (13,685 ft.), and Matterhorn (Mont Cervin) (14,780 ft.). The Rhaetian A. are at a lower level, though containing many peaks over 11,000 ft. high. The Ortler A. to the E. of these are slightly higher, Ortler Spitze itself being 12,800 ft. III. Of the E. A. the prin. chains are: (1) the Noric A., with the height of Gross-Glockner; (2) the Carnic A.; and (3) the Julian A.

The extreme inequality of the A. renders them easy to cross. Even in the highest part, the W. end of the Central Div., passes are numerous, and 5 railway tunnels now render travel easy. These tunnels are the Mont Cenis, connecting France and Italy; the Simplon, connecting the valley of the Upper Rhône with Lake Maggiore; the St. Gotthard, connecting Lake Lucerne and Lake Maggiore; the Brenner tunnel, connecting Munich and Innsbruck with Verona and Venice; and the Arlberg tunnel, connecting Switzerland and Austria. There are passes over most of these mts., among the more notable being the 2 St. Bernard passes and the Splügen.

The constitution of the A. is the result of much faulting and folding, mainly N.E. and S.W. Many upheavals have



occurred at different periods, and remarkable examples of thrusts are common. The higher ridges consist chiefly of crystalline schists associated with granite. The summits rise considerably above the line of perpetual snow, and the forms of vegetable life vary with the altitude from that common to Central Europe to that of the Arctic regions. The larger animals are becoming rare owing to the ravages of sportsmen, but the smaller fauna are numerous.

Glaciers occur chiefly in the Central A. They give rise to numerous rivs., of which the chief are the Rhine, Rhône,

made to pay. It was only by the summer of 1946 that all the services (with the exception of those sections traversing Ger., Austrian, or It. ter.) were reopened on the old scale, including the Furka, Grimsel, St. Gothard, Grand St. Bernard, and Maloja. To these were added a service over the new Susten Pass post-road, which now links the valley of the Reuss at Wassen, on the canton Uri side with the Bernese Oberland at Meiringen, through the Meiental, over the col between the Titlis and the Sustenhorn, past the Steingletscher, and down the Gaden valley to Innertkirchen on the



THE NORTH WALL OF THE EIGER (LEFT), AND THE MONCH

Po, and Danube. Their number is gradually decreasing, and must once have been very considerable.

The scenery of the A. is renowned throughout Europe and draws annually many tourists, who, before 1939, were gradually enriching the peasantry. The beauty of the lakes (such as Lucerne, Geneva, Brienz, Thun, Zürich, Constance, Maggiore, Como, Garda) and the int. views, together with the excitement and pleasure of int.-climbing, combine as attractions. Invalids may here seek repose and health in the sanatoria, such as Davos and St. Moritz; tourists may contemplate the natural marvels or give themselves up to the Alpine sports. The A. indeed deserve their name of the playground of Europe.

During the period of the Second World War there was naturally an absence of foreign visitors and many of the largest Alpine hotels went out of business for the duration of the war. Again, owing to changes of fashion in travel some of the largest, even before the war, could not be

Grimsel road. This fine motor road, a marvel of engineering, with a panorama of the finest Alpine scenery, should become one of the most popular of the great Alpine routes. It took 7 years to build, and is 18 ft. wide throughout its length, except at some of the angles and hairpin bends, where it widens up to 36 ft., and at the top of the pass it traverses the watershed by a tunnel a quarter of a m. long.

About no other geographical subject has so much been written as about the A. The various Alpine clubs all publish periodical papers, and these publications give good information. See also Tyn-dall's *The Glaciers of the Alps*, London, 1896, and *Hours of Exercise in the Alps*, 1873; Bonney's *The Alpine Regions of Switzerland and the Neighbouring Countries*, London, 1868; Ball's *Alpine Guide*, 3 vols.; Schlagintweit's *Untersuchungen über die physikalische Geographie und Geologie der Alpen*, Leipzig, 1850-54; Umlauf's *The Alps*, Eng. trans., London, 1889; F. Muirhead and M. Monmarché, *The French Alps*, 1923;

C. L. Freeston, *The Alps for the Motorist*, 1926; G. W. Young, *On High Hills: Memories of the Alps*, 1927; J. E. Tyler, *The Alpine Passes in the Middle Ages, 962-1250*, 1930; G. R. de Beer, *Early Travellers in the Alps*, 1930; F. Heritsch, *The Nappe Theory in the Alps: Alpine Tectonics*, 1905-28 (trans. by P. G. H. Boswell, 1929); W. W. Hyde, *Roman Alpine Routes* (Amer. Philosophical Society), 1936; J. J. Schatz, *Alpine Wonderland* (introduction by Sir C. Schuster), 1936; Leon W. Collet, *The Structure of the Alps* (2nd ed.), 1936; R. L. G. Irving, *The Alps*, 1939.

**Alps (Lunar)**, the name given to one of the chief lunar formations. It is really a wedge-shaped valley situated near the central line of the disk towards the north. This cleft is reckoned to be 83 m. long and from  $3\frac{1}{2}$  to  $5\frac{1}{2}$  m. broad.

**Alpujarras**, a mountainous dist. of Spain, lying to the S. of the Sierra Nevada. The valleys are extremely fertile and beautiful, and are inhabited by descendants of the Moors. 'Alpujarras' is the Moorish *al Busharat*, the grassland. The 4 largest vils. are Lánjarón, Orgíba, Trevélez, and Ugíjar.

**Alred**, see **ALURED**.

**Alruna**, a word etymologically connected with runes and used to denote a witch in anct. times. Sometimes the word was applied to images used in the black art.

**Alsace-Lorraine**, a dist. of France: it consists of Alsace and much of Lorraine, and is the region taken from France and added to Germany in 1871. It is bounded on the N. by the Bavarian and Rhenish Palatinates, on the E. by the Rhine, on the S. by Switzerland, and on the W. by the Vosges; has an area of 5605 sq. m. and a pop. of about 1,899,000 (1931). It is divided into Upper and Lower Alsace, and Lorraine. The dist., which is fertile and attractive, is generally undulating, and lies within the Rhine basin, being watered by the Ill, Moder, Saar, and Moselle, tribs. of the Rhine. A large proportion of the land is arable, and corn, flax, tobacco, wine, and fruit are largely produced. There is abundance of timber, and considerable mineral wealth, copper, lead, iron, coal, and rock-salt being mined, and silver has been found. The chief manufs. are textiles (especially cotton manufs.), chemicals, glass, and paper. The chief cities are Strasburg (pop. 175,000 in 1946), Mulhouse (6700), Metz (70,100), and Colmar. From the earliest times it has been a disputed ter. Originally inhabited by the Gauls, after the Rom. conquest it became largely Germanised. It became part of the Frankish empire, and after the tenth century of the Ger. empire, till part of it was ceded to France in 1648 at the peace of Westphalia. The remaining portion was seized by Louis XIV. in 1681, and secured by the peace of Ryswick in 1697. A few outlying dists. were secured by France after the 1789 revolution. Early in the Franco-Ger. war of 1870-71 the dist.

fell into the hands of the Prussians, and was immediately reorganised. It was formally ceded by the treaty of Frankfurt, much against the wishes of the inhab. In 1872, when obliged to make choice of nationality, 160,000 elected to be Fr., of whom 50,000 returned to France. In 1911 a local parliament or diet was estab. for A.-L.

Since the Franco-Ger. war of 1871 the deliverance of A.-L. from the Ger. yoke became an article of faith in the political creed of France. When the First World War broke out, the hope of regaining the lost provs. was reawakened in all its intensity, and even during the darkest days of 1917 when the issue of the war seemed in doubt, the passionate determination to settle the future of the provs. never wavered. When Moltke in 1871 insisted upon, and Bismarck, against his better judgment, acquiesced in, the annexation, the dominant idea in their minds was to secure a strategic frontier. At the same time, Germany probably unwittingly, also secured the largest deposit of iron ore in Europe and thereby in the ensuing 40 years built up her imposing fabric of prosperity and power. From the natural wealth of the ravished provs. Germany, in fact, derived that metallurgical ascendancy and the motive power for her industries upon which was founded no small part of her material progress, and, in consequence, her formidable naval and military strength. In actual figures, of the 2,800,000,000 tons of iron ore in all Germany before the First World War, Lorraine alone yielded some 2,000,000,000. Up to 1903 Germany had no need to import from abroad a single ton of ore, the supplies from Lorraine enabling her to maintain for over 3 decades an unrivalled industrial expansion. Without these resources Germany would, long before 1918, have exhausted her capacity for turning out the essential material of war. The Fr. people were by no means oblivious of these commercial advantages, but their ardent desire to recover the provs. was not primarily founded on the possibility of crippling the industrial power of Germany by depriving her traditional adversary of over 40,000,000 tons of ore a year. This transference of material resources was but the means to the accomplishment of the one permanent object—namely, to secure a boundary which, for the sake of future generations, should put an end once and for all to the perpetual menace of a Ger. invasion. Hence, throughout the vicissitudes of the First World War, the allied diplomacy was unequivocal in its assertion that when the time came for pourparlers, no lasting peace would be possible unless the restoration of A.-L. to France was made an indispensable condition.

Both on humanitarian and sentimental grounds the claims of France were indisputable, and it was from these grounds that the ardour of Fr. hopes during the 40 years after 1871 derived its impulse. But these same inspiring

motives were to a certain extent subordinated, during the war, which, by its very magnitude, threw into bold relief the greater issue of Germany's bid for world dominance. The relatively local question had in fact become a major issue for the whole of Europe, and it was axiomatic in the common policy of the Allies that the restoration of European equilibrium was not to be attained without the transfer of the 'lost provinces' to France.

If, however, the reinstatement was imperative as the solution of a question of modern practical politics, much justification for Fr. claims could be advanced on historical grounds. The Ger. plea that A.-L. ought always to have been Ger. ter. because the provs. formerly belonged to the Holy Rom. and Germanic Empire, was untenable, the subsequent long connection between the 2 provs. and France having so far eliminated all Ger. influences as to reduce the plea to a mere medieval archaism. From the standpoint of practical politics, however, it is useless to go further back than 1815, when the provs. on the l. b. of the Rhine were taken from France by the rest of Europe and given to Prussia with the object of checking Fr. aggrandisement. Cynicism prompts the retort that the war merely showed that the boot was on the other foot; but inasmuch as this transference had failed, by reason of the unsuspected and unscrupulous aggressiveness of Prussia, as a political measure of precaution to preserve the balance of power in Europe, it was recognised even before 1871 as an initial error. Yet the error was repeated in 1871, when the powers stood by while Germany, grown immeasurably in political stature since Waterloo, annexed, without the smallest pretext of adjusting the equilibrium of Europe, yet another considerable portion of her neighbour's ter., a portion embracing the most valuable Fr. iron-mines and most of her blast furnaces.

In the strategic concentration immediately before hostilities opened in the First World War, the Ger. Sixth Army of 5 corps under Prince Ruprecht of Bavaria was concentrated in Lorraine, E. of Metz. A detachment of *ersatz* (reserves) and *landwehr* troops was posted in the S. portion of Alsace. From this it was clear that an offensive in Alsace and Lorraine was intended as soon as possible. To disturb the Ger. concentration, the Fr. 7th Corps, stationed at Belfort, was ordered to advance towards Mühlhausen. One brigade reached Mühlhausen on Aug. 10th, 1911, but was driven back in disorder. After this the Fr. formed an army of Alsace and projected a second invasion. The army, moving on Aug. 15th, occupied the Vosges passes and reached Mühlhausen on the 19th. An army of Lorraine was also formed to watch Metz, and protect the flanks of the Fr. Second and Third Armies by driving the Gers. behind the outer works of Metz. These objectives formed part of the Fr. plan

for a general offensive on the whole W. Front, but the plan lacked the axiomatic merit of simplicity. When the Fr. had reached Saarburg the Gers. counter-attacked, drove the Fr. from the northerly passes and out of all but a small part of S. Alsace. In the course of 1915 a stalemate along the whole front resulted, which in Alsace involved give-and-take fighting on the high ground round Munster and very severe fighting for the massif known as Hartmannswillerkopf. No definite issue was reached and, as on the rest of the front, trench warfare succeeded the war of movement.

*The Treaty Settlement.*—Under Article 51 of the Treaty of Versailles A.-L. was restored to Fr. sovereignty as from the armistice of Nov. 11, 1918, and the provisions of the treaty establishing the delimitation of the frontiers before 1871 was restored. Free zones were estab. in the ports of Strasbourg and Kehl, in conformity with the navigation and railways clauses of the treaty, and due provision was made for reinstatement of inhabitants in Fr. nationality.

The Fr. Gov. re-introduced the old depts., Haut-Rhin, Bas-Rhin, and Moselle, and pursued, generally, a policy of assimilation. Fr. was introduced in the school curricula as a language of instruction and, in 1925, the Gov. proposed to control the Rom. Catholic Church by substituting Fr. lay legislation for the still valid Ger. laws. This proposal was dropped but it strengthened a Ger. autonomist movement and, in 1926, the *Elsass-Lothringer Heimatbund* or Home League of A.-L. was founded to promote political autonomy within the Fr. framework, an Alsatian Diet with a separate administration, equal language rights, and Ger. schools. In 1939 the autonomist party proper, called the *Elsass-Lothringische Partei*, had a number of representatives in the Fr. Chamber of Deputies who did not conceal their pro-Ger. sympathies. Ger. Nazi propaganda, in spite of Hitler's solemn renunciation of A.-L., was also very active in the provs. before the outbreak of the Second World War. Sev. autonomist leaders in A.-L. were arrested after war broke out, in Oct. 1939, and one of them, Charles Roos, was executed for espionage. Before 1940 there were about 1,500,000 Ger.-speaking people in A.-L., and while there are many who know no Fr., others are completely bi-lingual. Ger. was the prevailing language of the local press, and literature was produced in Ger., in the local Ger. dialect, and in Fr.

A.-L. was an occupied prov. in the Second World War. In 1940 the Gers. expelled tens of thousands of Frenchmen from Lorraine to make room for Gers. from the dists. subjected to Brit. bombing, giving them the choice of going to unoccupied France or to Poland. The persecution of the churches was carried out with special severity in Alsace, in 1941. Lessons in religion by priests and in private schools and divine service were forbidden. The theological faculty in Strasbourg Univ. was abolished, and the cathedral closed to divine service.

Germanisation of A.-L. proceeded apace in 1942. A decree was issued conferring Ger. citizenship on Alsace-Lorrainers who were serving in the Wehrmacht or S.S., or who were recognised as Gers. 'worthy of confidence.' Compulsory military service in the Ger. Army was introduced in Alsace on Aug. 26, and in Lorraine a week later for certain classes. Bürckel, the Ger. head of the civil administration in Lorraine, made strenuous efforts to Germanise the ter. Names of Fr. origin were suppressed and replaced by Ger. names and the use of the Fr. language was forbidden. But the Alsatians and Lorrainers resisted these attempts passionately and unanimously. Liberation came with the advance of the Amer. and Fr. forces in 1944-45. See further under WESTERN FRONT CAMPAIGNS IN THE SECOND WORLD WAR. See O. Lorenz and W. Scherer, *Geschichte des Elsasses*, 1886; R. Rouss, *Histoire d'Alsace* (22nd ed.), 1920; C. Spindler, *L'Alsace pendant la Guerre*, 1925.

Alsatia, the original name of Alsace, applied in the seventeenth century to the dist. of Whitefriars, between the Thames and Fleet Street, which was used as a refuge by debtors and criminals.



T. Fall

ALSATIAN

Alsatian, a large wolfhound, with stiffly erect ears and deep chest, so named because at one time it was used as a sheep-dog in Alsace. It is a hybrid of varieties of N. and S. Ger. sheep-dogs, and being intelligent, amenable to discipline, and readily trained, is often used as a police dog and a guide for the blind. Its popularity outside Germany and France is of comparatively recent date but, though a favourite both as companion and watch-dog, it is uncertain in temper; this, however, may result from improper feeding, lack of exercise or companionship, and absence of training or restraint. The height at the shoulder should be about 24 in., and 2 in. less in bitches. Colour may be varying shades of grey, brown, fawn, or black.

Al segno, a musical term of It. derivation, and meaning 'to the sign.' It directs the musician to revert to the sign ♯: and continue from there to the first double bar.

Alsen, is. in Little Belt, Baltic, off coast of Schleswig, about 19 m. long and 3-12 m. broad, with an area of about 120 sq. m. and a pop. of 25,000. Sonderburg, the chief tn., exports grain and fruit. Ceded to Germany in 1864, this originally Dan. is. was restored to Denmark in 1920.

Al Sirat (the Path), in the theology of the Mohammedans, is the name of a bridge extending over the abyss of hell, which must be passed by every one in order to enter paradise. It is described as being narrow like the edge of a sword.

Alster, riv. of Schleswig-Holstein, formed by confluence of 3 streams. Forms Great A. Lake near Hamburg, through which it flows into R. Elbe.

Alston, or Aldstone, a mkt. tn. and railway station in Cumberland, England, 29 m. E.S.E. of Carlisle. There are limestone quarries, and lead and copper are found in the vicinity. Coal is mined for lime-burning. Pop. 4000.

Alt, see ALUTA.

Alta (It., high), in music, generally used in addition to the word *ottava*, as *ottava alta*, an octave higher, *pü*, more, being by custom omitted.

Altai Mts., mountainous region of Tomsk (Siberia) and Mongolia, with an area of 53,000 sq. m. The highest ridge is the Saïughem, the mean elevation of which is about 5000 ft. The passes are few and dangerous. The valleys are very fertile, and there is great mineral wealth. The chief tn. is Barnaul.

Altair, an Arab word used to denote a star brighter than the first magnitude in the constellation of the Eagle (Aquila). The luminosity of A. is about 6 times greater than that of the sun, and it has a proper motion of 65" a century.

Altamaha, a riv. of Georgia formed by the junction of the Oconee and Ocmulgee and flowing into the A. Sound. It is 155 m. long, and is navigable for its entire length for boats drawing 5 ft. of water.

Altamira, a Sp. vil., in Santander prov., famous for its Paleolithic caves. In them in 1879 were discovered wall paintings representing bulls and deer. Believed to be over 25,000 years old.

Altamura, tn. of Apulia, Italy, 28 m. S.W. of Bari; it is of great antiquity, and has a fine Romanesque cathedral. Pop. 25,560.

Altar, a piece of religious furniture used for supplication and sacrifice. The use of the A. seems to have been almost universal in all times and among all nations. They have been found in Babylonian and Assyrian remains, and among Egyptian ruins. Early sacrificial hearths have been excavated in Palestine, and appear to be of the primitive description suggested in the early parts of the O.T. Later there were 2 kinds of As. in use among the Jews, for burnt-offering and incense respectively. In ant. Greece and Rome As. were again of 2 types: low pedestals which stood inside the temple before the sacred image, and large erections in the open air, used

for burnt sacrifice. In almost all circumstances As. have been considered as places of refuge, and frequently as fit places for the solemnisation of oaths. The earliest Christians had no As., but they came into use with the cessation of persecution, and were erected over the relics of martyrs. They were oblong in shape and placed in the axis of the church. In medieval times the numbers increased, the chief in each church being known as the 'high A.' After the Reformation, the Eng. Church replaced As. by movable communion tables.

**Altazimuth**, an important astronomical instrument for ascertaining the altitude (q.v.) and azimuth (q.v.) of celestial objects, whence the name. It consists of a telescope revolving on a horizontal axis, to the side of which is rigidly attached a vortical graduated circle (read by optical aid) for ascertaining altitude. This apparatus is capable of moving above a horizontal circle, also read by microscopes, by which the azimuth of a heavenly body is determined. It is sometimes called a universal transit, but as a rule in large instruments its horizontal motion is small, being confined to a few degrees each side of the meridian. The A. invented by the Dan. astronomer, Oleus Rømer, 1690, was capable of measuring all parts of the sky. All important observatories have this instrument, and Airy's A., erected at Greenwich in 1847, considered a fine instrument in its day, was replaced by a larger one in 1897.

**Altodmann**, a vil. in Baden. It was the favourite residence of the successors of Charlemagne.

**Aldorf**, cap. of canton Uri, Switzerland, lies in a fruit-growing valley, surrounded by imposing mts. It is the traditional scene of the exploits of William Tell, the liberator of Switzerland from the Austrian yoke. A monument to him stands in front of an old fifteenth-century tower. In the Tell Theatre (1899) Schiller's *Wilhelm Tell* is performed by A. residents in summer. Pop. 4200.

**Aldorfer, Albrecht** (1480-1538), Bavarian painter, engraver, and architect, b. and d. at Iatisbon, of which he was city architect and a burgher. His most famous picture is the 'Battle of Arbelis,' at Munich. His engravings on wood and copper rank next to those of Dürer.

**Altea**, seaport of Spain, 25 m. N.E. of Alicante, on the Mediterranean. It has a good harbour and some trade. Pop. 3200.

**Altels**, a well-known summit of the Alps, 11,930 ft. in height, and situated E. of the Gemmi Pass. Avalanches make the ascent very dangerous. First climbed in 1834 by a Swiss.

**Alten, Carl August** (1764-1840), Hanoverian and Brit. general. Served in Hanoverian army till its disbandment in 1803, when he came to England and entered the Ger. Legion, serving in Hanover and Copenhagen. He commanded in the Peninsular war, and at Quatre Bras and Waterloo. When the

Ger. Legion was disbanded he went to France, and later returned to Hanover, where he became minister of war.

**Altena**, tn. in Westphalia, Prussia, on R. Lenne, 18 m. S.W. of Arnsberg. It contains an anct. castle, and before 1939 had manufs. of iron, copper, brass, and nickel goods. Pop. 16,000.

**Altenavia**, the Lat. form of Altona (q.v.), a tn. in the prov. of Schleswig-Holstein, near Hamburg.

**Altenburg**, a tn. in Thuringia, Germany, formerly cap. city of duchy of Saxe-Altenburg, Germany, on R. Pleisse, 25 m. S. of Leipzig. It contains a famous ducal castle, built on a perpendicular porphyry rock, the scene of the abduction of Princes Albert and Ernest in 1455, and numerous fine municipal buildings. Before 1939 there were manufs. of brushes, gloves, hats, cigars, and woollen goods. Pop. 41,300.

**Altenessen**, a suburban dist. of Essen, Rhineland, Germany, lying 2 m. N. of that city, possessing coal mines and (in 1939) machine factories. Pop. 35,000.

**Altengaard**, seaport tn. in the prov. of Finnmark, Norway, at the head of the Alten Fjord.

**Altenstein, Karl, Baron von** (1770-1840), Prussian statesman, b. at Ansbach, and studied at Erlangen and Göttingen. He was head of the finance dept., and later minister of public worship and education, rendering great service to the univ.

**Altenstein**, a castle in Saxe-Meiningen, Germany, on the S. slope of the Thüringwald near Eisenach. It is associated with St. Boniface, 'the Apostle of Germany' (b. 680) and Martin Luther.

**Alternative**, a medicine that alters the processes of nutrition for the better, restoring, in some obscure way, the normal functions of the organs. The most important As. are arsenic, iodine and the iodides, and mercury.

**Alter Ego** (Lat.), signifies 'another I.' The phrase is used to denote Sp. viceroys when exercising regal power, and was used at Naples when the crown prince was made vicar-general during the rebellion of 1820. The words are used of a close friend.

**Alternate**. In geometry angles are said to be A. which are made by 2 lines with a third, on opposite sides of it. In algebra those terms of a proportion are said to be A. which are separated from one another by another term; thus in the proportion 2 is to 4 as 8 is to 16, 2 and 8 are A. terms, as also 4 and 16.

**Alternating Current**, in electricity, is one which flows for an interval of time in one direction followed by a flow in the opposite direction, or, in other words, a current flow in alternately reversed directions through or round a circuit. A simple A. C. is one which periodically passes through a definite cycle of changes of equal period  $T$  so that the number of cycles per sec., which is  $f = 1 \div T$ , remains constant at such a value as 50 cycles for power circuits (low-frequency currents for electric motors); or, e.g., 1,000,000 cycles for a

high-frequency circuit such as is used for 300-metre wavelength radio apparatus. The alternating pressure required to produce A. C. may be obtained from electrical machinery such as alternators, rotary converters, magneto machines, or from thermionic valve generators. A. C. is economical because it allows of transmission across long distances at high voltage and of step down to the required pressure by means of a transformer. A. Cs. are suitable for most domestic electrical appliances, such as heating, lighting, and radio receivers. See also ELECTRIC POWER GENERATION.

**Alternation of Generations** is a biological phrase which indicates a curious condition in the life-hist. of some animals and plants, which have both a sexual and an asexual stage of reproduction. It is not found in the lowest plants, but is seen in some of the intermediate ones very clearly, and in animals is best observed in low forms of existence. It is believed that this condition can be traced in the highest of animals as it can be in the highest of plants. In the vegetable kingdom the asexual plant which produces spores is called the *sporophyte*, the sexual plant which produces gametes (sexual cells) the *gametophyte* or *oöphyte*. In the ferns and horsetails the generation with which we are familiar is the sporophyte—in the fern the small brown bodies beneath the fronds are the asexual spores—and the sexual generation is not prominent; the gametophyte is a small green body growing on damp soil which gives rise to both male and female organs which produce again a fern as we know it. In the life-cycle of the mosses and liverworts the gametophyte generation is more conspicuous: the sporophyte is often seen rooted in the gametophyte as a brown stalk with a spore case at its apex. Among animals the Coelenterata exhibit alternation of generations very clearly: here the ovum which has been fertilised produces a polyp capable of giving rise to buds, which in their turn give rise to jellyfish which contain sexual elements. See D. H. Scott's *Structural Botany*, part II, 1907, for comparisons of gametophyte and sporophyte generations; see also J. J. Steenstrup's *Om Forplantning og Udvikling gjennem vekslede Generations Rækker*, 1842.

**Alternator**, the machine used in electricity to produce an alternating current. It is a species of dynamo.

**Althæa**, a genus of plants of the order Malvaceæ, which are common in Europe. *A. rosea*, the hollyhock, found wild in China, grows in Brit. gardens; *A. officinalis*, the marsh mallow, grows in marshes.

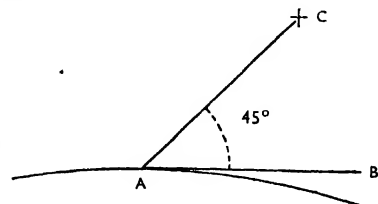
**Althein**, or **Asparagon**, a crystallisable white substance found in the root of marsh mallow and asparagus.

**Althing**, the parliament of Iceland, organised at Thingvellir in A.D. 928 to supersede the Norse Thing. It has 36 members, of whom 30 are elected by vote of the people, but the remaining 6 are appointed by the king.

**Althorn**, a tenor (E flat) or baritone (B flat) saxhorn (*q.v.*), often used instead of a Fr. horn in military and brass bands.

**Althorp**, see SPENCER.

**Altitude**, an astronomical term signifying the angle of elevation of a celestial body above the horizon. Thus if A be the position of an observer on the earth, A B the line of the horizon directly beneath the heavenly body, and C represents the planet or star, then the angle C A B is the A. of the star. As the circumference of a circle is divided into 360°, it follows that a star exactly overhead is of an A. of 90°, while one, as in diagram, half-way between zenith and horizon, is of an A. of 45°.



The A. of a star, as ascertained by a sextant, is used for calculating a ship's position at sea. See ALTAZIMUTH and AZIMUTH.

**'Altmark' Affair**. See under NAVAL OPERATIONS IN THE SECOND WORLD WAR.

**Altmühl**, a riv. in Bavaria and affluent of the Danube. It is 103 m. long. Charlemagne conceived the idea of connecting the riv. with the Regnitz and hence with the Rhine and Danube. This plan was executed by the Bavarian Gov.

**Alto** (It., high), or counter-tenor in men, is the highest pitch in the male voice; in women (contralto) and boys it is the lowest pitch of the voice. It originated in church music of the sixteenth century, and as it was too difficult for boys to learn to sing A., and women, according to the rule 'nullus taceat in ecclesia,' were not allowed to sing in church choirs, it was assigned to men of high-pitched voices.

**Alto Clef**, the clef with C on the middle line, is now used only for viola music, but formerly was employed for the alto voice.

**Alto di Viola** is an It. term for the tenor violin, so called because it used to take the highest parts, while the *basso di viola* took the lowest in instrumental music.

**Alton**: 1. A tn. in Hampshire, England, on R. Wey. Contains many breweries and sev. paper mills and iron foundries. Pop. 6200. 2. City in Madison co., Illinois, U.S.A., on R. Mississippi, 25 m. N. of St. Louis. The seat of a Catholic bishopric. It has numerous manufs., an oil refinery, a lead smelter, and limestone quarries. Pop. 30,000.

**Alton, Eduard Josef d'** (1772-1840), a distinguished anatomist and naturalist, was b. at Aquileia, near Trieste. His chief work is *Die Naturgeschichte des*

*Pferdes*. His son, Johann "Eduard d'A. (1803-54), was a prof. of anatomy at Halle, and wrote *Handbuch der Vergleichenden Anatomie des Menschen*.

**Altona**, formerly a city of Prussia incorporated in the city of Hamburg in 1937. It has fine municipal buildings, and before 1939 had numerous manufs., of which tobacco was among the chief. In 1640 A. became Dan.; in 1713 it was burnt by the Swedes; and in 1866 passed to Prussia. Pop. 242,000.

**Alton Towers**, a Staffordshire pleasure resort, famous for its gardens. It was once a seat of the Earls of Shrewsbury. The gardens, which extend as far as the Churnet R., are adorned with statuary, grottoes, ornamental fountains, and temples. The house contains a picture gallery and armoury.

**Altoona**, city in Blair co., Pennsylvania, U.S.A., 117 m. E. of Pittsburgh. It has large locomotive works, machine shops, and freight yards connected with the Pennsylvania railway. Pop. 80,000.

**Altorf**, see ALTENDORF.

**Alto-relievo** (It., high relief), a term applied to that mode of sculpture in which objects are made to project from their background to the extent of more than one-half their thickness, so that some portions of the figures stand free. See BAS-RELIEF.

**Altötting**, tn. in Bavaria, Germany, on R. Morren. It is an anct. Rom. Catholic place of pilgrimage, on account of a famous image of the Virgin. Pop. 5000.

**Altanstadt**, a vil. of Prussia near Lützen. Charles XII. of Sweden concluded the treaty here with Augustus II. of Poland, whereby the latter resigned the kingdom of Poland.

**Altringham**, or **Altringham**, a tn. in Cheshire, England, on Bridgewater Canal, 8 m. S.W. of Manchester, for which it raises fruit and vegetables. It has sawmills and an iron foundry, and manufs. yarns. Pop. 21,400.

**Altruism** (Fr. *l'altruisme*, from It. *altru*, of or to others), a word coined by the Fr. positive philosopher, Augusto Comte, and introduced by his followers into this country, where it has passed into general use. It is the antonym of *egoism*, and if the latter be defined briefly as 'each for himself,' A. stands for 'living for others.' The altruistic instinct is a social instinct or impulse in human nature, and is evidenced in kindness, veneration, and affection. It is not the exclusive possession of humanity, but manifested by many of the higher types of animals. It was this instinct or tendency in man that Comte wished to raise to a conscious principle, or an ethical ideal, which made the chief aim of human action that of seeking the welfare of others. Herbert Spencer in his *Data of Ethics* sought to show that in the course of social evolution egoism and A. would be conciliated.

**Altstätten**: 1. A tn. of Saint Gall, Switzerland. The Austrians took it in 1410. It has famous sulphur springs. 2. A tn. in Zürich.

**Altwasser** (lit. 'old water,' a name

which refers to the mineral springs), a vil. in the former Prussian prov. of Silesia. There were extensive iron foundries in the vicinity. Glass and porcelain were also manufactured here.

**Alum**, the crystallised double sulphate of aluminium and potassium, corresponding to the formula  $Al_2(SO_4)_3 + K_2SO_4 + 24H_2O$ . The name is also used to designate a group of bodies of the same general structure, where the first sulphate is that of aluminium, chromium, or ferric iron, and the second that of lithium, potassium, sodium, the ammonium radical, rubidium, caesium, thallium, or silver. The A. of the ancts. (Lat. *alumen*) included a group of astringent substances of which potash A. and the naturally-occurring aluminium sulphate appear to have been the chief. In the Middle Ages the manuf. was mainly in the hands of its., and a factory at Tolfa in the papal states continued producing up to a recent period. The raw material of the manuf. is A. rock, composed chiefly of alunite or A. stone. This is mixed with fuel in a furnace and after roasting exposed to the air. The mass is then lixiviated with hot water, the clear liquid drawn off and allowed to crystallise. A. is also made from A. shale, which is either allowed to decompose by exposure, or roasted. During the process, free sulphuric acid is formed, which acts upon the clay, producing aluminium sulphate, which is then dissolved out. Potassium sulphate or ammonium sulphate is added to the solution, when potash A. or ammonia A. is produced.

A. possesses a sweet astringent taste, and is used as a mordant in dyeing and in the manuf. of paper. Most As. have an acid reaction, but, if an alkali is slowly added to the solution, a precipitate is formed which is re-dissolved on stirring. If this be done until no more precipitate can be dissolved, the product is a neutral A., which is much used in dyeing, as it readily gives up alumina to the coloring matter.

**Alum Bagh**, a fort in India about 4 m. from Lucknow which, during the Indian mutiny in 1847, was used as a fortress by the rebels. It was taken by Havelock and Outram, and was later defended for a long period by the latter.

**Alum Root**, or *Heuchera Americana*, belongs to the order Saxifragaceæ and grows in N. America; it makes a valuable styptic. The term is also applied to the *Geranium maculatum*, of the order Geraniaceæ. A. R. is used for ulcers.

**Alum Shale**, a rock found in the Silurian and Devonian systems, and composed of iron pyrites, distributed through bituminous shale. It is used for the manuf. of aluminium sulphate.

**Alum Stone**, or **Alunite**, a double compound of potassium sulphate and basic aluminium sulphate. Mixed with quartz, it composes the alum rock from which alum (q.v.) is obtained.

**Aluminium** (written and pronounced in Canada and U.S.A. 'aluminum'), a metallic chemical element, symbol Al,

atomic number 13, atomic weight 26.97. The oxide alumina ( $\text{Al}_2\text{O}_3$ ) occurs in combination with silica in clays and felspar of all kinds, and is, therefore, widely distributed. The oxide is found uncombined in bauxite, corundum, emery, ruby, amethyst, sapphire, and topaz, the different colours being due to the presence of oxides of iron, cobalt, or chromium. Alumina was supposed to be an oxide long before separation into its elements was actually accomplished. A. was first produced in 1827 by Wöhler, who fused potassium and chloride of A. in a closed crucible, obtaining the metal in the form of a grey powder. Afterwards, Wöhler improved his method and succeeded in procuring the metal in a purer form in fused globules. In 1854 Deville tried the same process, but replaced the potassium by sodium, and the 'silver made from clay' of the Paris exhibition of 1855 drew much attention to the question of its economical production. The method used at the present day is the electrolysis of alumina. An iron pot, lined with carbon, is charged with cryolite and heated to about  $800^\circ\text{C}$ . by the electric current. For the electrolysis, a bundle of carbon rods is used as the anode, whilst the pot itself forms the cathode. The oxygen liberated combines with the carbon of the anode to form carbon dioxide, whilst the A. falls to the bottom of the vessel. More alumina is added and the process continued, the molten metal being drawn off from time to time.

A. is a tin-white metal which is malleable and non-magnetic, has a specific heat of  $.222^\circ$ , a sp. gr. of from 2.70, a coefficient of expansion of .0000238, and melts at  $658^\circ\text{C}$ . It is about as hard as silver under ordinary circumstances, but becomes harder on rolling. If pure, it does not oxidise easily on exposure to the air at ordinary temps., is soluble in hydrochloric acid, and forms numerous useful alloys. The properties which make A. such a valuable metal are its lightness, ease of working, non-poisonous qualities, and the fact that it is not affected by air. It is used for making cooking utensils, electric conductors, motor-car parts, and, in fact, for any purpose where saving in weight is a great consideration. The bulk of the metal is used in alloyed rather than pure form. Alloyed with a small percentage of magnesium, its hardness and toughness are considerably increased without making any material difference in its weight. See also DURALUMIN.

**Alundel Furnace**, a system of cylindrical furnaces used for the reduction of mercurial ores. Retorts of glass, called As., collect the condensed vapour.

**Alunno, Niccolò** (c. 1430-1502), an Umbrian painter of the fifteenth century who lived at Foligno. He excelled in expression, and some of his works are: The altarpiece at Deruta, 1458; a Madonna in the Duomo, Assisi, besides many other works at Assisi; an altarpiece at the church of San Niccolò, Foligno;

and 'The Saviour' and 'A Virgin of Mercy' in the Louvre. A bust of Christ in the National Gallery and a painting of Giotto, in the Univ. Gallery, Oxford, are ascribed to A.

**Alunogen**, the word used by Boudant to designate hydrous sulphate of aluminium, and popularly called alum rock. The chemical formula is  $\text{K}(\text{AlO})_2(\text{SO}_4) \cdot 3\text{H}_2\text{O}$ , and the sp. gr. is  $32.6$ . It is white with green shades through it. The substance is found in volcanic dists., and in mines and caves. From it is extracted alum proper.

**Alured, Alred or Alfred**, of Beverley, was an old Eng. chronicler and historian of the early part of the twelfth century, and treasurer of the church of Beverley. He wrote a hist. of Britain up to 1129.

**Aluta, or Alt**, a trib. of the Danube which rises in the Carpathian Mts., flows through Transylvania and Rumania, and enters the Danube near Nicopolis. The total length is c. 250 m.

**Alva, tn.** in Clackmannanshire, Scotland, at foot of Ochils, 7 m. N.E. of Stirling. It has woollen manufs. E. of the tn. is the picturesque Silver Glen. A. House is the seat of the Johnstones. Pop.: burgh 4107; par., 5120.

**Alva, or Alba, Fernando Alvarez de Toledo, Duke of** (1508-83), descendant of one of the noblest families of Spain, was a soldier from his youth. After fighting in Tunis, Germany, and Italy, he was in 1567 given, by Philip II., command in the Netherlands. Here he carried on a reign of terror till his recall in 1573.

**Alvarado, Juan Bautista**, a Californian who raised an insurrection against the Mexican Gov. in California and defeated the Mexicans in the decisive battle of San Buenaventura. From 1836 to 1838 he took the revolutionary title of governor, and from 1838 to 1842 was officially recognised by the Mexican Gov.

**Alvarado, Pedro de** (c. 1495-1541), Sp. explorer and adventurer, b. at Badajoz. His first command was in the Cuban expedition to Yucatan in 1518, and he served under Cortés in the conquest of Mexico, becoming famous in 1620 by the 'Salto de A.', a long leap by which he saved his life. In 1523 he was sent to subdue Guatemala, and was later appointed governor of that dist. by Charles V. In 1534 he made an unsuccessful expedition against Quito. He became governor of Honduras in 1537. In 1541 he was killed in an affray with the Indians near Guadalajara, Mexico.

**Alvarado**, seaport of Mexico, on riv. of same name, 40 m. S.E. of Vera Cruz. The port is too shallow to admit vessels of more than 13 ft. draught. Pop. 6000.

**Alvares, Fernam** (1540-99), Portuguese poet, b. in India. He was leader of 2 expeditions to the Coromandel coast. The most remarkable of his works is his *Lusitania Transformada*.

**Alvarez, Francisco** (d. 1540), a Portuguese traveller, was b. at Coimbra in the latter part of the fifteenth century. He was one of those sent by King



Emanuel of Portugal on an expedition to Abyssinia in 1515, and on his return to Lisbon, 1527, he wrote an account of his travels. This work, a copy of which is in the Brit. Museum, is remarkable for its simplicity and frankness.

**Alvarez, Don José** (1768-1827), an eminent Sp. sculptor, b. at Priego, Cordova. He first worked with his father, a stonemason, and obtained admission into the Academy of Granada, 1788. He afterwards became a member of the Academy of Cordova, and a student of the Academy of San Fernando, Madrid. In 1799 he received a pension from Charles IV. to study at Paris and Rome, and his statue of Ganymede, fashioned in 1804, gained for him the reputation of the greatest of contemporary sculptors. He was appointed prin. sculptor to the king of Spain, 1825. He also modelled portrait busts of Ferdinand VII., Rossini, and the duchess of Alba. A group representing the 'Defence of Saragossa' and a group of 'Antiochus and Memnon' are 2 of his chief works.

**Alvarez de Cienfuegos, Nicasio** (1764-1809), a Sp. writer, b. at Madrid. Of his tragedies the most famous are *Piloco* and *Loraida*. He was a member of the Sp. Academy.

**Alveary**: 1. A bee-hive. 2. The outer canal of the ear, *meatus externus*.

**Alvensleben, Konstantin von** (1809-92), a distinguished Prussian general, served in the Dan. war. He commanded in the Franco-Prussian war and won high distinction at Orleans and Le Mans. A fort at Metz was named after him.

**Alverstone, Richard Everard Webster, Viscount** (1842-1915). He was called to the bar in 1868, and became Q.C. 10 years later. In 1885 he became attorney-general in the Conservative Gov., though he was not a member of Parliament, and had not held the office of solicitor-general. He then entered the House of Commons as member for Launceston. He led the case as counsel for the *Tinies* against the Irish party before the Parnell Commission in 1889; he was Brit. representative in the Berlin Sea arbitration in 1893; and leading counsel in the Venezuela arbitration in 1899. In May 1900 he became master of the rolls—a position previously held by Sir Nathaniel Lindley—and was raised to the peerage. In Oct. of same year he succeeded Lord Russell of Killowen as lord chief justice; and in 1903 he was one of the 3 arbitrators on the Alaska Boundary question. Resigned in 1913 through ill-health and was made a viscount.

**Alvin, Louis Joseph** (1806-87), Belgian poet and librarian of Brussels library. Among his dramas are *Sardanapale* (1834), a tragedy, and *Le Folliculaire anonyme* (1835). He also wrote *L'Alliance de l'art et de l'industrie*, *Life of Louis Gruyer*, *Souvenirs de ma vie littéraire*, *Les Recontemplations* (a reply to Victor Hugo's work), *Le Commencement de la gravure aux Pays-Bas*, and *André van Hasselt, sa vie et ses travaux*.

**Alvincoy, Nicolas, Baron of** (1735-

1810), an Austrian commander, b. in Transylvania. He distinguished himself in the Seven Years War, and fought against the Turks in 1789. He was commander-in-chief of the Austrian army against Napoleon, but was defeated at Aroca (1796) and at Rivoli (1797), and lost Mantua. He was made governor of Hungary, and field marshal in 1808.

**Alwar**: 1. Native state in Rajputana, India, enclosed by Gurgaon, Patiala, Nabha, and Jaipur. Area 3024 sq. m.; pop. 700,000. 2. Cap. city of A. state, lying in a valley overlooked by a fortress. Pop. 48,000.

**Alyattes, king of Lydia** (c. 610-560 B.C.), estab. the Lydian empire. He made war against Miletus and against the Medes. At the Halys, where hostilities were intercepted by the occurrence of an eclipse of the sun, peace was concluded with Media, and the riv. was made the boundary between the 2 kingdoms. He greatly extended his empire before his death. His tomb is still in existence, but has been plundered by excavators. He was succeeded by Croesus.

**Alyn, N. Wales**, see ALLEN.

**Alypius** (fl. c. 360 B.C.), a Gk. authority on music and harmony of the age before Euclid. An ed. of collected fragments of his writings was ed. by Mark Meibom (*Antiquæ Musicæ Auctores Septem*) in 1652, and again by Jans (*Musici Script. Græce*) in 1895.

**Alyssum** (from the Gk. *ἄλυσσα*, madness, and a privative, a name given because according to popular belief it cured madness), a plant of the Crucifer order, found in the region of the Mediterranean and in N. Asia. The plant is cultivated in various varieties, e.g. *A. saxatile*, a rock-garden variety.

**Alyth, tn.** in E. Perthshire and co. of Angus, Scotland, on Burn of A. 26 m. N.E. of Perth. It has woollen, linen, and jute manufs. To the N.W. lies the forest of A. Pop. 1710.

**Alzey, a tn.** of Rhein-Hessen in Germany, on R. Selz, 18 m. S. of Mainz. An anc. imperial city. Had dyeing, weaving, and brewing industries. Pop. 9000.

**Amadavat, or Avadavat, *Estrilda amadava***, is a small singing bird which is to be found in the Indian Archipelago, about 5 in. long, carmine coloured, with the upper parts brownish grey and wings spotted white. Belongs to the Ploceidae family.

**Amadeo, Giovanni Antonio** (1447-1522). It. sculptor and architect; was b. at Pavia. In collaboration with others, he decorated the Certosa at Pavia. His monument of Bartolommeo Colleoni, a Venetian general, with its fine bas-reliefs and statue of the commander, in Bergamo, is one of the masterpieces of Renaissance sculpture. He also took part in the sculpture of the great octagonal dome of the cathedral of Milan. See Lübke, *History of Sculpture*, 1878.

**Amadeus**, the name of 9 counts and dukes of Savoy:

**Amadeus 1.** (d. 1078), the son of

**Adelaide**, marchioness of Susa, and of **Humbert I.**, count of Maurienne in Savoy, called the White-handed; some say he was the son of Oddo, **Humbert's** son. After his father's death he governed conjointly with his mother the states of Susa and Maurienne. This made him master of the great pass over the Alps into Italy, by Mont Cenis, from which circumstance much of the subsequent importance of his family was derived. He married a daughter of **Gerald**, count of Burgundy. **A.** was mainly instrumental in reconciling the Emperor **Henry IV.** and Pope **Gregory VII.**, and thus putting an end to the disastrous contest between the church and the empire. He *d.* soon after, and was buried in the cathedral of **St. Jean de Maurienne**.

**Amadeus II.** (1103-48) succeeded his father, **Humbert II.**, count of Maurienne. He accompanied **Henry V.** to Rome, where the latter was crowned emperor. As a reward for his fidelity **Henry** gave him the title of count of Savoy, and vicar perpetual of the empire. **A.** also took the title of marquis of Turin, and married the daughter of the count, or dauphin, as he was called, of Vienne, on the Rhone. **A.** accompanied **Louis VII.** of France to the Holy Land, distinguished himself at the siege of **Damascus**, and relieved **Acro**, which was besieged by the Turks. On his return from Syria he landed in the is. of Cyprus, where he *d.* at Nicosia of fever.

**Amadeus III.** (1233-46) succeeded his father, **Thomas**, as count of Savoy, and his brother inherited Piedmont. **A.** obliged the count of Genevois to acknowledge himself his vassal; he also conquered the Chablais and the Lower Valais, and sent troops over the Little **St. Bernard** into the valley of Aosta, and subjugated that country.

**Amadeus IV.** (1285-1323), called 'the Great,' succeeded his uncle **Philip** as count of Savoy. By his marriage with **Sybilla**, countess of Bugey and Bresse, these dists. of anc. Burgundy were united to his states, and he succeeded in otherwise extending his dominions. **A.** afterwards embarked for the E., where he assisted in the defence of Rhodes against the Turks in 1315. He *d.* at Avignon, where he had gone for the purpose of urging Pope **John XXII.** to proclaim a new crusade.

**Amadeus V.** (1329-42) succeeded his brother **Edward** as count of Savoy, and continued the war against the Dauphin of Vienne.

**Amadeus VI.** (1342-83), called the Green Count, son and successor of the preceding. In 1349 **Humbert**, last dauphin of Vienne, disgusted with the world in consequence of the death of an only son, gave up his title and principality to **Charles**, grandson of **Philip of Valois**, and retired into a Dominican convent. **A.** was not pleased at this cession, which gave him a much more formidable neighbour than he had before, and a war ensued, in which **A.** defeated the Fr. in 1354. A treaty was

concluded at Paris the following year, by which the count of Savoy gave up to France the dists. he possessed in Dauphiny beyond the Rs. Rhone and Guiers; and he, on his part, was acknowledged undisputed sovereign of Faucigny and the country of Gex, as well as suzerain lord over the counts of Genevois, all which titles had been till then subjects of contention between the counts of Savoy and the dauphins of Vienne. **A.** also obliged the marquess of Saluzzo to pay him homage, and thus extended his dominion on the It. side of the Alps. **A.'s** alliance was courted by the prin. sovereigns of his time. The Venetians and the Genoese had long quarrelled about the possession of the is. of Tenedos, in the Aegean Sea, but at last agreed to give full possession to the count of Savoy. **A.** in his old age was still thinking of another expedition against the Turks, but the Pope **Clement VII.** persuaded him first to accompany **Louis**, duke of Anjou, in his expedition to Naples, to which kingdom he was called by the adoption of Queen **Joanna I.** **A.** went in 1382 and shared in the first successes of **Louis**, who conquered the Abruzzi and Apulia. A contagious disease, however, spread through the army, and the count of Savoy was one of its earliest victims. He *d.* at Santo Stefano, in Apulia. He was the founder of the order of the Annunziata.

**Amadeus VII.** (1385-91), called the Red Count, succeeded his father, **A. VI.** He made the important acquisition of the country of Nice, by the unanimous wish of the citizens, in 1388, and the act was solemnly registered as a public document. He was killed by a fall from his horse.

**Amadeus VIII.** (1391-1451), son and successor of the preceding, was created first duke of Savoy in 1416 by the Emperor **Sigismund**, who declared the court of the duchy to be independent of the imperial chamber. **A.** waged war against **Filippo Maria Visconti**, duke of Milan, and took **Vercelli**, which he united to his dominions. He also annexed to them the country of Genevois, having purchased the rights of the various claimants after the extinction of the male line. Thus the whole of Savoy was finally united under one sovereign. He was also prince of Piedmont, baron of Vaud, lord of Nizza, Mondovi, and Valenza, duke of Aosta, etc. **A.** gave his subjects a code of laws called 'Statuta Sabaudie.' After 43 years' reign, and having lost his wife, **Maria Beatrix** of Burgundy, he retired in 1434 to the hermitage of Ripaille, a delightful spot on the Lake of Geneva, with 6 of his nobles, whom he created knights of **St. Maurice**. He entrusted the administration of his states to his son, **Louis**. For 5 years he lived at Ripaille, and here he mediated the peace of Arras between France and England. The council assembled at Basle, having deposed **Eugenius IV.** in 1439, called **A.** to the papal chair. **A.** at first refused, but being persuaded by the cardinal

of Arles, he assumed the pontifical dignity with the name of Felix V. At the same time he definitely abdicated his temporal sovereignty to his son Louis. In June 1440 the new pope proceeded to Basle, where he was solemnly crowned. France, England, Spain, Germany, and Lombardy acknowledged him as pope, whilst the rest of Italy and the Venetians supported Eugenius, who continued to reside at Rome. The schism lasted 9 years; but Eugenius having *d.*, the cardinals who were at Rome elected Nicholas V., when Felix himself proposed to renounce his rights to Nicholas, and thus terminate the scandal of the Church. He *d.* at Geneva.

**Amadeus IX.** (1465-72), duke of Savoy, succeeded his father, Louis. He was called the Pious, from his goodness and charity to the poor. He married Yolande of France, sister of Louis XI. He reigned only 8 years, and *d.* at Vercelli. He was succeeded by his son Philibert. Louis, A.'s brother, was for a while king of Cyprus, but his title to that kingdom was disputed. As heirs of Louis, however, the kings of Sardinia continued to assume the title of Cyprus.

**Amadeus**, a salt lake of S. Australia, surrounded by mts. and desert country. It was discovered in 1872 by Ernest Giles.

**Amadis de Gaula**, the hero of a famous medieval romance, owing its inspiration to the Arthurian cycle. Its date and origin are disputed, but it appears to have come from N. France through Provence to Spain, where it was well known in the fourteenth century. It survives only in a Castilian text, supposed to have been written by Montalvo towards the end of the fifteenth century. There is some evidence of an earlier Portuguese text. The oldest existing ed. appeared at Saragossa in 1508. It enjoyed a widespread popularity, being trans. into It. in 1510, into Ger. a little later, and into Fr. in 1548. Southey trans. it into Eug. in 1803.

**Amador de los Rios, Don José** (1818-1878), a Sp. writer, *b.* at Baena. His greatest work is a *Critical History of Spanish Literature*, 1861-65. He wrote besides works on Sp. art, a *History of the Jews in Spain and Portugal*, 1861, and a *History of the Town and Court of Madrid*. He was prof. of literature at the Madrid Univ. and a member of the Academy.

**Amadou** (Old Provencal *amadour*, lover) (*Polyporus fomentarius*), is a fungus which grows on old trees, and is used for stopping hæmorrhages. Boiled in strong saltpetre it forms the Ger. tinder of tobacconists.

**Amagasaki**, a seaport of Japan, situated at the bay of Asaka, on the is. of Hondo. It has a pop. of about 50,000.

**Amager**, is. of Denmark, in the Sound, and separated from Zealand by Copenhagen harbour. Christianshavn, on the N. end, forms part of Copenhagen. Possesses shipping and gardening industries. Area 25 sq. m. Pop. 100,000.

E.E. I

**Amakosa**, or **Ama-Xosa**, an important div. of the Bantu people. Their complexion is olive, nostrils broad, lips thick, hair woolly. They are sharp-witted and courageous. They inhabit chiefly Transkei, Tembuland, and Pondoland.

**Amalaric** (A.D. 506-531), the last Visigoth king of Spain, was the son of Alaric II. and grandson of Theodoric II. He was only 5 years old when his father *d.* in 506, but he was proclaimed king when he came of age. He married Clotilda, daughter of Clovis, king of the Franks, which marriage led to religious disputes and a war with Chilbert, king of Paris, the brother of Clotilda. The Spaniards were defeated in 531, when A. was killed.

**Amaldar**, a name used to designate the governor of a prov. under the Moslem rule in India.

**Amalekites**, an anct. tribe in S. Palestine, apparently connected with the Edomites, and including the Kenites, and frequently mentioned in the O.T. as foes of the Israelites. The references are disconnected and confused. The A. seem to have harried the Israelites' rear as they entered Canaan from Egypt, for which extermination was prophesied. They were defeated at various times by Joshua, Saul, David, and the Simeonites. The traditional hostility still appears in Esther.

**Amalfi**, seaport and archiepiscopal see, Campania, Italy, on the gulf of Salerno, 24 m. S.E. of Naples. Its situation is extremely picturesque, and it contains many interesting ruins and a fine Romanesque cathedral, dating from the eleventh century. In medieval times A. was of great importance, being an important centre for E. trade and an independent republic. In 1131 it was reduced by King Roger of Sicily and later taken by Pisa, after which it rapidly declined. In 1343 much of the town was destroyed by flood. The chief industry, paper manuf., is now disappearing, and the harbour is little used. Pop. 7600.

**Amalgam**, a mixture or compound of one or more metals with mercury. As. are usually obtained by direct union or by placing the metals with mercury into dilute acid. Those containing a large proportion of mercury are in a liquid form, but if there is a small proportion of mercury the A. is frequently found to crystallise. Tin A. is used for backing mirrors; tin and zinc As. are used for coating the rubbers of electrical machines; gold and silver As. are used for gilding purposes; and an A. consisting of gold, silver, copper, tin, and mercury, in varying proportions, is used for stopping teeth.

**Amalgamation**, the process of uniting or alloying a metal with mercury. It is by A. that gold and silver are extracted from the rocks in which they occur. A. processes cause the metals to combine with the mercury to form an amalgam.

**Amalia**: 1. Anna, duchess of Saxe-Weimar-Eisenach (1739-1807), *b.* at.

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Wolfenbüttel, the daughter of the duke of Brunswick-Wolfenbüttel. Married Duke Ernest Augustus of Saxe-Weimar-Eisenach, and at his death in 1758 became regent for 17 years of her son, Carl August, in whom she and Wieland, his tutor, fostered a love of art and literature. She was distinguished by her wise rule, and especially by her patronage of letters and learning. Weimar became the literary centre of Germany, and the court was frequented by Goethe, Herder, and Schiller. 2. Elizabeth, landgravine of Hesse-Cassel (1602-51). The grand-daughter of William I., prince of Orange. In 1619 she married William V., landgrave of Hesse-Cassel, and after his death in 1637 ruled for many years as regent with great energy and wisdom.

**Amalteo**, Pomponio (1505-c. 1588), an It. painter of the Venetian school, was a pupil of Pordenone. His prin. works are the frescoes in the castle, and in the Santa Maria Church of San Vito, and in the church of San Francesco, Udine.

**Amalthæa**: 1. The nurse of the infant Zeus, represented as a goat, and from whom was taken the *cornu copie* (horn of plenty), which automatically filled itself with whatever its possessor desired. 2. The sibyl who brought to Tarquin the 9 books containing Rome's destiny.

**Amana**, township in Iowa co., Iowa, U.S.A., near Cedar Rapids. A. is the home of the A. Society, a Ger. religious communistic body, whose views and practices are closely related to the doctrines of Schwenkfeld and Boehme. Pop. 1500. Consult Bertha Schambaug's *Amana, the Community of True Inspiration*, 1908.

**Amana** (riv.), see ABANA.

**Amani**, in Tanganyika Ter., near Sigi. Here is the Anani Agric. and Research Institute, formerly the Ger. experimental station founded in 1902, in the Usambara Mts. It is now the head research and experimental station for the whole of Brit. E. Africa. Its scientific staff consists of the director, a plant pathologist, an entomologist, a soil chemist, a biochemist, a plant physiologist, a plant geneticist, and a botanist. The aim of the centre is to study problems requiring more prolonged research than can normally be expected from the technical staff of any single administrative dept., and problems arising in more than one ter. towards the solution of which the comparative method may be expected to make an effective contribution. (Report of the Imperial Agric. Research Conference, 1927; Hailey, *An African Survey*, 1938.) The experimental grounds range over an altitude of from 1300 to 3600 ft., with a rainfall of 75 in., and include a sub-station near Tengenji not much above sea-level. Associated with it is the Lyamungu Coffee Research Station.

**Amanita** is a sub-genus of the fungus *Agaricus* (q.v.). *A. muscaria* is a poisonous plant of a bright orange-red colour, with white swellings.

**Amanullah Khan**, b. 1892, ex-king of Afghanistan, third son of Habibullah Khan, on whose assassination he became amir in 1919. He adopted the title of king instead of amir in 1926, and his second wife, Surayya, a Damascus woman, whom he married in 1914, became queen consort, her official style being the Shah Khanum. Made war on Brit. forces in 1918-19. In 1928 made an extensive tour of Europe with Queen Surayya to study W. institutions, but the outcome of his reformatory zeal was disastrous and he lost his throne (see also AFGHANISTAN).

**Amapala**, only port on Pacific coast of Honduras; situated in Fonseca Bay. Its roadstead is deep enough for the largest vessels to lie within a few yds. of shore. Silver, timber, and coffee are exported. Pop. 3000.

**Amapala Gulf**, see FONSECA.

**Amputaland**, a protectorate in Zululand, created by proclamation of Nov. 22, 1887, and annexed to Zululand in 1897. It now forms part of the prov.

**Amarantus**, or **Amaranth**, is a genus of the order Amarantaceæ. It is found in tropical and temperate climates. Some of the species are well-known Brit. plants, e.g. *A. caudatus*, love-lies-bleeding.

**Amarapura**, former cap. of Burma, on R. Irrawadi, 6 m. N.E. of Ava. Founded in 1783, it suffered from fire in 1810, and from earthquake in 1839. In 1860 Mandalay became the cap. and A. has now fallen into ruins.

**Amara-Sinha** (fl. c. A.D. 375), a famous Hindu poet and lexicographer, was the author of a vocabulary of the Sanskrit language known as *Amara Kosha*. Little is known about him save that he was a Buddhist and that most of his works were destroyed by the orthodox Brahmins.

**Amargosa Desert**, see DEATH VALLEY.

**Amari, Michele** (1806-89), It. historian and orientalist, b. at Palermo, and entered the gov. service. His most famous work, *La Guerra del Vespro Siciliano* (1841), was prohibited, and he fled to France, where he studied Arabic and modern Gk. During the revolution of 1848 he returned to Italy, and was made vice-president of the committee of war in Sicily, later visiting France and England on diplomatic missions. He remained in Paris till 1859, when he again returned to Italy to fight under Garibaldi. He was minister of public instruction, 1862-64, and prof. of Arabic at Pisa and Florence till 1878, when he removed to Rome.

**Amarna**, see TEL AL-AMARNA.

**Amaru**, José Gabriel Condorcanqui (1742-81), a revolutionary of Peru, and known as the 'last of the Incas.' He was leader of the opposition party to the Spaniards, but suffered defeat, and he and his house were put to death with extreme cruelty.

**Amaryllidaceæ** is an order of monocotyledonous plants which differ from the Liliaceæ in having an inferior ovary. They grow best in tropical Asia, Africa,

and Brazil, but some are European. The perianth leaves are in 2 whorls of 3 joined, the stamens are the same, the ovary is trilobular and inferior; many of the plants have a well-developed corona. *Narcissus pseudo-narcissus*, the daffodil, and *Galanthus nivalis*, the snow-drop, belong to this order.

**Amaryllis**, a genus of Amaryllidaceæ (q.v.), so called from Virgil's shepherdess of that name. *A. belladonna*, the belladonna lily, grows in Cape Colony.

**Amasa**, son of the Ishmaelite Ithra and of Abigail, sister of David. He commanded Absalom's army; after his defeat by Joab he submitted to David and replaced Joab as the latter's chief commander. Joab treacherously slew him at 'the great stone of Gideon.' The name means burden. See 2 Sam. xvii. and xx.

**Amasia**, ant. tn. and vilayet, Asiatic Turkey, in valley of Yesil-Irmak. Formerly court of kings of Pontus. Exports silk and salt. Pop. 30,000.

**Amasis**: 1. Amasis I. (c. 1635-1578 B.C.), first Pharaoh of eighteenth dynasty. He expelled the Hyksos from Egypt and began conquests in Asia. 2. Amasis II. (570-526 B.C.), 28th Pharaoh of twenty-second dynasty. Fought against Nebuchadnezzar; conquered Cyprus, and had much communication with Greece.

**Amateur** is a Fr. word derived from the Lat. *amare*, to love, and means one who follows any pursuit from inclination, actuated by no desire for gain. The word was at first used to denote a person who had a particular aptitude for any art, or a penchant towards a scientific pursuit. In general, it meant any one who had a taste for the fine arts. This meaning of the word is not now so often used; with the rise of professionalism in all sports, A. is employed as the antithesis of professional. The monetary consideration still forms the dividing line between the two classes in all pursuits, but no general definition can be given which would apply to all As. Alike, as the governing bodies of various sports are by no means in accord as to what constitutes professionalism. Thus, the A. Athletic Association defines as an A. 'one who has never competed for a money prize or staked bet, or with or against a professional for any prize, or who has never taught, pursued, or assisted in the practice of any athletic exercises as a means of gaining a livelihood.' The rules of the A. Rowing Association are somewhat stricter. In addition to excluding any person who has competed for money, or with a professional, or taught for profit, their rules exclude also from being an A. oarsman, sculler, or coxswain any one who has ever been employed in or about boats or in manual labour for money or wages, and any one who is, or has been, by employment a mechanic, artisan, or labourer, or engaged in any menial duty. The rules of cycling differ somewhat, and certain competitions are allowed between As. and professionals. In cricket an

A. is, of course, not supposed to receive monetary rewards for playing, but the number of lucrative sinecures found for clever As. has caused it to be said that the difference in their case is that an A. receives much more money than the professional. The line is somewhat difficult to draw in golf, but an A. is generally considered to be one who does not play for or accept money prizes in competitions open to professionals.

**Amati**, the name of a family of It. violin makers and the founders of the Cremona school. Their instruments are now esteemed of priceless value. Andrea, the eldest, was b. c. 1520 and d. c. 1578. According to Fétis he was probably a pupil of one of the master violin-makers of Brescia—Gaspar da Salo or Maggini. But according to Dr. Fellowes's article in Grove (3rd ed.) he was not a pupil of these makers but a contemporary. In his instruments we can see the evolution of the violin out of the viol—in fact Andrea made viols as well as the newer violin. His workmanship far excels that of the older masters. Unfortunately the delicacy of the fabric he used in their manuf. has little favoured the preservation of Andrea's violins. They are strikingly original, but still preserve the antique Brescian upright sound-hole. The shape is extremely elegant, and the workmanship singularly fine. The belly and back of the violins are high in proportion to their other parts. The finish is amber varnish. This pattern produced exquisitely clear, sweet, and delicate tones, but the volume of sound was proportionately small. The tone of the fourth string was particularly weak. Andrea also made violoncellos and tenors. Andrea was succeeded by 2 sons, Antonio (1550-1638) and Geronimo (1551-1635), whose services to the craft were also signal. However, it was Nicolo (1596-1684), son of Geronimo, who was the greatest of the family. His violins have what the violins of the first lack—intensity and richness. This was acquired by using thicker wood and reducing the elevation. Stradivarius was the pupil of Nicolo. The fame of their descendant has somewhat eclipsed the renown of Andrea and his sons, but they will always be remembered for their pioneer work in the introduction of a new craft into Italy.

**Amatitlán**, a dept., tn., and lake in Guatemala. The tn. of A., situated on the lake, was once a flourishing centre for the manuf. of cochineal, but changes in the dyeing processes have killed its prosperity.

**Amato**, Giovanni Antonio d' (1475-1555) was a distinguished It. painter. He painted in oil and in fresco, but almost all his frescoes have disappeared, and his style is very similar to that of Perugino.

**Amato**, or **Amatus**, Joannes Rodericus (1511-68), often called Amatus Lusitanus, was b. at Castel-Branco, Beira, Portugal, and was an eminent physician. He travelled in France, the Netherlands, Germany, and Italy, and practised his profession in Ancona till 1555, and from

there he went to Pesaro and Thessalonica (Salonika). His 2 works, *Exegemet a in Prioris Duos Dioscoridis de Materia Medica Libros* (Antwerp, 1536), called in subsequent eds. *Enarrationes in Dioscoridem* and *Curationum Medicinalium Centuria Septem*, show an intimate acquaintance with the writings of the Gk. and Arabic physicians, and contain curious notices both in medicine and in natural hist.

**Amatol**, see EXPLOSIVES.

**Amatongaland** (Tongaland), a portion of the colony of Natal, situated on the E. coast of S. Africa, N. of Zululand and S. of Portuguese E. Africa. The inhab. are chiefly Tongas, a div. of the Bantu race, and number about 40,000. A. was annexed to Natal in 1897, being previously a part of Zululand. Prior to that time it was ruled by an hereditary dynasty under Brit. supervision. The area is 600 sq. m.

**Amatrice**, Cola dell', painter and architect of Naples, *fl.* in the first half of the sixteenth century. His work shows the influence of Raphael, Michelangelo, and the other masters, but does not reach their level of excellence. Among his paintings perhaps the best is the 'Death and Assumption of the Virgin,' in the Capitol.

**Amaurosis** (Gk. *ἀμαυρόσις*, dark) is total blindness where the outward appearance of the eye is unaffected, and usually caused by affections of the brain.

**Ama-Xosa**, see AMIAKOSA.

**Amaziah**, or **Amaziah** (c. 838-809 B.C.), literally means 'one strengthened by Jehovah,' and is the name of the ninth king of Judah, who reigned for about 29 years, succeeding his father Jehoash. He avenged his father's murder (2 Kings xiv. 5; 2 Chron. xxv. 3), and fought with the Edomites, gaining a great victory in the Valley of Salt, and taking *Selah* of Petra. He next declared war against Jehoash, king of Israel, but was defeated and taken prisoner. Jerusalem was also taken and plundered. A., after having recovered his liberty, was slain at Lachish, where he fled when a conspiracy was formed against him.

**Amazon**, the largest riv. in the world, flows through S. America. It has a great network of tribs. which drain and water a vast extent of ter. It is also designated by various savage names according to the localities through which it flows. To this riv., or a portion of it, the name *Marañon* is frequently applied. Though some hold that *Marañon* is of Indian derivation, modern geographers incline to trace it to the Sp. word *maraña*, which means (1), tangled underwood; (2), a tangled skein; and conclude that the word describes the tortuous course of the riv. or the rough country through which it flows. So also geographers tend to reserve the name *Marañon* for the more N. of the 2 head affluents of the A. The riv. was first discovered by Vicente Yañez Pinzon, a Spaniard. He called it the *Rio Santa Maria de la Mar Dulce*, afterwards corrupted into *Mar Dulce*. The word

A., the most general name for the riv., is said to be derived from the Indian word *amassona*, a boat-destroyer, because the riv. at certain places and in certain seasons is very dangerous; but the name may simply have been suggested by the encounters of the early Sp. explorers with the fighting women of savage tribes. Some difficulty in distinguishing the affluents makes the exact estimation of the length of the riv. itself subject to dispute. The maximum length given is 4000 m., and, with its tribs., the A. is said to possess 30,000 m. of navigable waterways; so great is the volume of water discharged from its mouth, that fresh water is said to be found on the surface of the ocean 40 m. out. The riv. and its tribs. drain an immense area—nearly one-half of S. America. The prin. tribs. are the Tocantins, the Xingú, the Tapajós, the Madeira, the Purús, the Ucayali, the Negro, the Yapura, the Nago, and the Morona. The Casiquiare, a unique natural canal, covering 180 m., connects the Orinoco with the Rio Negro, and is a most interesting natural phenomenon. The riv. with its tribs. to a large extent is navigable, but is rendered dangerous by floods and rapids, e.g. the tidal phenomenon called the bore or Pororoca in the main stream of the lower riv. The natural resources of the place have consequently been slow in development. The riv. flows through deep gorges and vast forest stretches which are but thinly populated. The climate is naturally hot and vaporous, but is rendered equable by trade winds which blow regularly through the dry season. The riv. abounds in fish, but eatable meat and fruit are difficult to procure in the locality. The A. is subject to ann. inundations. The waters rise early in Nov. and reach their maximum height in June, and then the volume decreases steadily till the end of Oct. The rise and fall of some of the affluents is not coincident. The riv. is navigable for ocean steamers for upwards of 2500 m., Iquitos, in Peru, being at the head of ocean navigation. Belém, or Para, on the Tocantins channel, and Manaus, on the Negro, are the 2 chief ports. The main channel of the A., though 50 m. wide, is dangerous to navigation owing to shifting is. and sand-banks; ocean vessels therefore use the Tocantins channel 200 m. to the S. In 1867 the riv. was opened to the commerce of all nations at certain points, i.e. Tabatinga on the A.; Cameta on the Tocantins; Santarém on the Tapajós; Borba on the Madeira; Manaus on the Rio Negro. The forest tracts which the great riv. divides are to a large extent undisturbed. Through the tangled growths the sun scarcely penetrates, and the fauna and flora are still incompletely classified, though several scientific expeditions have been made with that object. The most notable product of the basin is rubber, which early in the century was exported in large quantities. Being wild rubber and difficult to collect, however, it stood no

chance in competition with the rubber of the E. Indies as soon as the plantations came into bearing. During the First World War, therefore, when shipping was scarce and few imports could be relied upon, the inhab. of the A. basin turned again to the growing of sugarcane, corn, manioc, brazil nuts, cinchona, cotton, tobacco, ipecacuanha, sarsaparilla, and vanilla, all of which are now exported, especially sugar, in large and increasing quantities. Some rubber is also exported, chiefly from Belém and Manaus. So far progress in trade and agriculture has been hampered by the difficulty of obtaining food supplies and inadequate transportation facilities. The Mamoré-Madeira railway, 220 m. in length, which was opened in 1912, has reduced transport difficulties in one direction, by circumventing the 200 m. of rapids and falls of the great Madeira. Expeditions to study the industrial possibilities of the dist., as the Fleming expedition of 1919, and that of the Amer. Rubber Mission in 1923-24, give further promise of future development. As yet, however, the land is for the most part still virgin and very difficult of access. Further knowledge was gained of the ter. in 1924, when an expedition under Dr. Hamilton Iltis explored and mapped the Rio Negro with the aid of a hydroplane. The population of the A. basin is estimated at 1,500,000. See A. R. Wallace, *A Narrative of Travels on the Amazon and Rio Negro*, 1853; H. W. Bates, *The Naturalist on the River Amazon*, 1863; J. Orton, *The Andes and the Amazon*, 1870; H. M. Tomlinson, *The Sea and the Jungle*, 1912; J. F. Woodroffe, *The Upper Reaches of the Amazon*, 1914; K. G. Grubb, *Amazon and Andes*, 1930; P. Flemining, *Brazilian Adventure*, 1933; F. McDermott, *The Amazing Amazon*, 1933; A. S. N. Wadia, *A Thousand Miles up the Amazon*, 1936; and W. N. Merryman, *Northern Caballero*, 1941.

**Amazonas**: 1. The northernmost and largest prov. of Brazil and a federal state of the republic. It is watered by the Amazon, and has an area of 731,360 sq. m. The country for the most part is plain-land, covered with vast undisturbed forests, and subject to annual flooding. The chief products are india-rubber, brazil nuts, and cacao. Valuable vegetable products are also found. The cap., Manaus, is a flourishing tn. Pop. 450,000. 2. A N. prov. of Peru. Area 13,943 sq. m. The natural barriers of the country greatly impede trade, though Chachapoyas, the cap., has a fine cathedral and univ. Pop. about 65,000. 3. A ter. in extreme S. of Venezuela, adjoining 1. It is drained by the Orinoco and Rio Negro. It is covered with dense forests. Cap. Atures. Pop. 42,000.

**Amazons**, a mythical race of warrior women, associated with the riv. Thermodon in Cappadocia. They had no males in their tribes, and their unions with their male neighbours were only temporary and for the sake of the procreation of children, among which male infants

were destroyed or banished. In Homer the A. are said, in the reign of Iobates, to have invaded Lycia, but were conquered by Bellerophon. One of the labours of Heracles was to seize the girdle of the A. queen, Hippolyte. Among the most famous of the legends of the A. are those of their alliance with Priam in the Trojan war and of their invasion of Attica. In the former adventure, Queen Penthesilea was an ally of Priam, but was slain by Achilles. The grief of Achilles when he discovered his victim was a favourite subject of anct. art. In the latter adventure they were defeated by Theseus, and their queen, Antiope, had a son, Hippolytus, by him. The Amazonian legends seem to have grown out of the warlike attitude of the women of the savage Thracian tribes—women much freer and more robust than the women of Greece. In art they are represented with the right breast bared.

**Ambala**, or **Umballa**, the name of a dist. of N. India and its chief city. Here was ratified, in 1869, the treaty between Lord Mayo, governor-general of India, and the Amir Sher Ali of Afghanistan. The tn. has many fine public buildings. Pop. 90,000.

**Ambassadors**, diplomatic envoys sent by a king, or the head of a great state, to a foreign gov. to represent him, negotiate his affairs, and guard the home interests abroad. He bears credentials in the form of a sealed letter addressed by the sovereign who sends the embassy, by which it is understood that his negotiations will be regarded as if transacted by the sovereign himself. Tradition has estab. that only important kingdoms and states are at liberty to negotiate by means of A. proper. Lesser states negotiate by means of ministers of the second rank. An A. is distinguished from a minister of the second rank by the right of transacting his negotiations in the king's presence in public and private, but in practice the sovereign with whom he has transactions is always attended by a few of his ministers. As representing the person of the sovereign, an A. is entertained at the foreign court with great ceremony and pomp. He is not subject to the laws of the state wherein he is resident, and the exemption applies also to his suite, but violent abuse of this privilege may lead to his recall.

**Ambato**, see **HAMBATO**.

**Ambeer**, or **Amber**, the anct. cap. of Jaipur, Rajputana, India, about 5 m. from the city of Jaipur. The present cap. It is now in ruins, which are a testimony of its former splendour.

**Amber**, a resinous fossil. The name is Arabic, but has reached us through the Fr. Thales, one of the 7 sages of Greece, discovered its power of attraction when subjected to friction. Friction really generates in amber negative electricity, and the word electricity is itself derived from the Gk. word ἤλεκτρον, meaning A. A., though now obtained like a mineral product, was originally a distillation from an extinct coniferous

tree. It frequently preserves within itself plant-structures and insects. The Gk. legend is an explanation of its resinous origin. A. among the ancients was said to be the tears of the sisters of Phaethon, who, on account of their grief for his death, were metamorphosed into poplars. A. is of a golden hue varying greatly in intensity. The bluish tints occur when pyrites are present. Sometimes A. is transparent and sometimes opaque. The cloudy appearance is caused by imprisoned bubbles. The chemical formula is  $C_{10}H_{16}O$ . Succinic acid is obtained from A. by dry distillation, and it is this that produces the aromatic odour familiar to those who have burned the substance. A. is obtained in greatest quantities at the Baltic. After storms quantities of A. are found cast up on the shore. Systematic dredging and mining operations are carried on in the sea and in the 'blue earth.' A. has a wide distribution, being found in varying quantities in Europe, Australasia, and America. A., when immersed in a hot oil-bath, becomes soft, and pieces of it may be fused by dipping the required parts in hot oil and pressing. A. is largely used for personal adornments, vases, mouthpieces of pipes, etc. An artificial A. is occasionally substituted composed of copal, camphor, and turpentine, which is detected by the fact that it melts in cold ether, whereas real A. remains unchanged.

**Amber Fish**, a dark-coloured fish of genus *Seriola* with decurved snout.

**Amberg**, a tn. of Germany, in Bavaria, and once the cap. of the Upper Palatinate. It has fine buildings and once had many thriving industries. Pop. 28,000.

**Amberger**, Christoph (c. 1490-1563), a Ger. painter, was b. at Nuremberg and d. at Augsburg. He painted in oil and in fresco chiefly portraits, the most important of which are: The Emperor Charles V. (1532), Berlin Museum; Hieronymus Sulzer (1542), Gotha; Sebastian Münster (1552), Berlin Museum; 'A Portrait of a Man,' Brussels Museum; and a Madonna in the cathedral of Augsburg.

**Ambergris**, a fatty substance excreted by the sperm whale, probably a pathologic product. It has a fragrant musky odour when warmed, and is used in perfumery and also as a medicine in catarrh and nervous diseases.

**Ambert**, industrial tn. in Puy-de-Dôme, France. Its chief historic interest is an old church of the fifteenth century. Pop. 6800.

**Ambianum**, the Lat. form of Amiens, used in documents and in bibliography.

**Ambidexterity**, the capacity of using both hands indifferently. Some philosophers maintain that man is born ambidextrous, and that the habit of using the right hand in preference to the left is acquired. An argument against this theory is the fact that nearly all savage peoples use the right hand more than the left. A. is cultivated in certain schools of drawing.

**Ambie**, a mrkt. tn. and port in North-

umberland, England, near the mouth of the Coquet, and not far from Warkworth. Pop. 4300.

**Ambleside**, a mrkt. vil. in the Lake dist. of Westmorland. It is picturesquely situated, and is surrounded by beautiful hills. It has many literary associations. In its vicinity are Rydal Mount, the famous house of Wordsworth; Fox How, a summer residence of Thomas Arnold; and the Knoll, the home of Miss Martineau. It is an attractive resort for tourists. Pop. 2400.

**Amblygonite**, a mineral similar in appearance to felspar. It is a lithium and aluminium fluophosphate,  $Li(AlF)PO_4$ , and is used in commerce for the extraction of lithium.

**Amblyopia**, dimness of vision not due to refractive errors or organic disease of the eye. It may be congenital or acquired. In the latter case it is sometimes due to hysteria, but more often to the use of tobacco or alcohol, and in some cases to other drugs, or lead poisoning. The condition is progressive and may ultimately, though rarely, lead to total blindness. The centre of the field of vision is most affected, and there are blind spots for both red and green. The cause is said to be retrolbular neuritis or inflammation of the eyeball part of the optic nerve. The treatment consists in rest and nourishment of the system, and the abandonment of the predisposing cause, if it be the use of tobacco, alcohol, or other drugs.

**Amblyopsis** (Gk. ἀμβλῶς, obtuse, ὄψ, eye), a bony fish found in Kentucky. Its name arises from the condition of its eyes, which are covered by the skin.

**Amblypoda**, an extinct species of mammal which had 5-toes on each foot ending in hoofs and not nails. A. belonged to the Eocene period. In size they were not less than the elephant. Remains of the group are found in Eng. soil, but the best specimens have come from N. America. A. were represented in Europe by the Coryphodon.

**Amblystoma** (Gk. ἀμβλῶς, obtuse, στόμα, mouth), a genus of salamanders of the order Urodela, found in N. and S. America. The larva of *A. tigrinum* is the axolotl, which at this stage may become sexually mature and lay eggs; it occurs in the U.S.A., Vancouver, and Mexico. Some axolotls never normally metamorphose into A., but may be made to undergo the change by administration of thyroid gland.

**Ambo** (Gk. ἀμβω, from ἀναβαίνειν), the reading-desk of early basilican churches, superseded by the pulpit.

**Amboise**, an historic Fr. tn. on the Loire in the dept. of Indre-et-Loire. It is situated amid beautiful vineyards and gardens, and the country is called the Garden of France. The castle of A. is of great historical interest. It embraces the famous Logis du Roi, built by Charles VIII., and the chapel of St. Hubert, containing the remains of Leonardo da Vinci. Many other beautiful specimens of medieval architecture are in the tn. It is the scene of the



conspiracy of A., a disastrous Huguenot plot, 1560, and of the edict of A., 1563, conceding freedom of worship to the Huguenots. Pop. 4100.

**Amboise, Georges d'** (1460-1510), a Fr. cardinal and statesman. He came of a noble family of Fr. diplomats. As a youth he attached himself to the duke of Orleans, and through his influence was made archbishop of Narbonne and subsequently of Rouen. On the accession of the duke of Orleans to the throne as Louis XII., A. was made cardinal and prime minister. His foreign and domestic policy were moderate and beneficial. On the death of Alexander VI. he aspired to the papal see, but failed, and the remainder of his life was occupied with abortive scheming. He d. at Lyons after returning from an It. invasion. He was buried at Rouen, where a fine tomb was erected.

**Amboyna**, a Dutch residency forming since 1927 with Ternate residency the gov. of the Moluccas; also an is. and tn., area of residency about 20,000 sq. m. Pop. 405,000. The is. has an area of 266 sq. m. Pop. of is. 40,000, of tn. 11,726, of whom 1453 are Europeans and Eurasians. The tn. of A. is a well-built place with broad straight streets, often treelined. It lies at the head of the bay, which is over 5 m. wide at its entrance. Jap. forces landed on the is., Jan. 31, 1942, and were in complete occupation by Feb. 7. The second largest naval and air base (after Surabaya) in the Dutch E. Indies, A. was heavily bombed on Jan. 30, 1942, by Jap. planes and later 3 Jap. cruisers and 6 destroyers with a number of transports began the invasion of the is. Despite bitter resistance A. fell to the Jap. on Feb. 2 (1942). Surrendered by the Jap. in 1945.

**Ambracia**, a tn. of anct. Epirus. It was colonised c. 640 B.C. by Corinth. It became a democracy, but retained strong allegiance to Corinth. In the Peloponnesian war it played an important part. During the Macedonian supremacy it was autonomous, but eventually became the cap. of Pyrrhus's kingdom.

**Ambrée, Mary**, the heroine of one of the ballads in Percy's *Reliques*. At the siege of Ghent she distinguished herself as a soldier and fought against the Spaniards to avenge the death of her betrothed. Her name occurs sev. times in the plays of Ben Jonson, and was used as a synonym for a virago.

**Amoridge**, a bor. in Beaver co., Pennsylvania, U.S.A. Pop. 20,000.

**Ambriz**, a Portuguese seaport of W. Africa, which exports produce of the numerous plantations of the dist., principally vegetable oils.

**Ambrose, St.** (c. 340-97), one of the most famous fathers of the Church, was b. at Trèves, where his father was prefect of Gaul. He shares, with others, the legend that a heaven-favoured career was predicted for him by the omen of bees swarming on his lips in infancy. He rose to the position of prefect, with headquarters at Milan, and succeeded to the bishopric of Milan in

the year 374. The anniversary of his acceptance of this honour is now marked with a festival in the Catholic Church. In his new capacity he was scrupulously pious, and renounced his wealth and former connections. He was no respecter of persons, and did not hesitate to excommunicate for a time Theodosius, emperor of the E., on account of his consent to the massacre of the Thessalonians. A., as president of the synod at Aquileia in 381, won a memorable victory over the Arian heretics. He also successfully opposed Aurelius Symmachus, who had presented to Valentinian II. a petition for the restoration of divers pagan rites. His victory was largely due to his popularity. The piety of his life, his generosity and sympathy, had drawn to him the hearts of the people. He united to his theological abilities keen political genius, and his diplomatic services to the emperor were signal. He wrote homilies, exegeses, commentaries, but it is on his hymns that his fame mainly rests. Among these are numbered *Eterne rerum conditor* and *Veni redemptor gentium*. To him St. Augustine was greatly indebted. Bigotry was, perhaps, his worst failing.

**Ambrosia**, a term used by the ancients to designate the food of the gods, while their drink was called nectar. The word signifies immortal, and A. was said to be able to bestow immortality on mortals, as in the case of Tithonus and Berenice. A. was also applied to wounds in story, and used as an unguent for the hair.

**Ambrosian Chant**, the name given to the collected music of the early Church, arranged by Ambrose, bishop of Milan, in the fourth century. Of these chants we have no extant specimens, or, if we have, they are indistinguishable from the Gregorian chants of Pope Gregory, by which they were superseded in the sixth century.

**Ambrosian Library**, a famous library at Milan founded (1809) in memory of St. Ambrose by Cardinal Borromeo. It numbers 400,000 vols. and 10,000 MSS. Among its most famous possessions are a Gk. Pentateuch, fifth century, a Josephus on papyrus, a Plautus, and a commentary on the Psalms by St. Jerome. In air attacks in the Second World War fire severely damaged the building, but the most valuable contents were saved from destruction.

**Ambrosius Aurelianus, fl.** in the fifth century. He was king of Britain, and drove the Saxon invaders under Hengist and Horsa to the is. of Thanet. He is said to have been of Rom. stock in the *Historia Brittonum*. Geoffrey of Monmouth, however, calls him a son of Arthur.

**Amby** (Lat. *armarium*, Fr. *armoire*), a cupboard or niche in a wall to hold utensils, etc. It is sometimes written in the form *almery*, being confused with almonry and taken to mean a place for alms. The word is usually applied to a locker in churches wherein were placed sacramental vessels, vestments, etc.

In its corrupt usage the word was formerly applied to the almonry of Westminster Abbey.

**Ambulance** (from the Lat. *ambulare*, to go, through the Fr. *hôpital ambulant*), a conveyance in which the disabled in battle or in civil life are removed to hospital, or in which patients are treated in default of hospital wards. For field use A. wagons were first introduced by the Fr. as late as the end of the eighteenth century. Larrey (1766-1842) was the inventor, and had the fervent support of Napoleon. Improvements were made

ship. Various independent charitable societies render A. aid in time of war. A civil A. association was first organised in England in 1878 by the Knights of St. John. This society provided training in first aid, that assistance might be at hand for those who sustained injuries in civil life. The success of the enterprise led to the formation of A. corps in all parts of the country, and now policemen, railway-men, and factory employees hold certificates of the association. This society also provides auxiliary relief forces which co-operate with the Royal Army Medical Corps in treating the injured and wounded in time of war. The evolution of A. work has been rapid and a notable success.

**Ambulatory**, in architecture, the space enclosed by a colonnade or an arcade. It is the name used for any part of a building intended for walking in, as the aisles of a cathedral or church. In the peripteral temple of the Gks. the lateral or flanking porticoes are properly termed A.; and the cloister of a monastery is surrounded by an A.

**Ambuscade**, or **Ambush** (obsolete Embush). Both words are derived ultimately from the late Lat. *imboscare*. As the derivation shows, this term originally signified a military manœuvre whereby troops were concealed in wooded ground in order to make a covert attack on the enemy, but now the word is more loosely used to denote a surprise attack of any description. An A. is an obvious manœuvre of self-defence and is employed in the most rudimentary warfare. Ditches, trenches, and covers of that nature are merely developments of this simple ruse. The great advantage to be derived from an A. is the fact that by its skilful manipulation a small company of men may gain the supremacy over troops which far outnumber them. The wide range of modern appurtenances of war and more advanced military tactics have made the employment of the simple ambush useless.

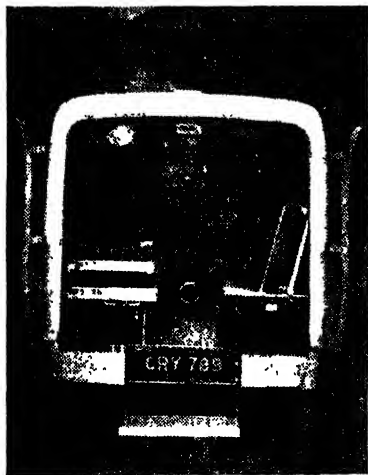
**Ameer**, see **EMIR**.

**Ameland** is one of the Friesian Is. situated off the coast of Friesland, Holland. The people are mostly fishermen. Pop. 3000.

**Amelia**: 1. A port on Pemba Bay on the E. coast of Africa and cap. of Portuguese Nyasaland. 2. An is. in Nassau, Florida, U.S.A., about 17 m. long.

**Amélie-les-Bains**, a coast tn. of S.W. France in the dept. of Pyrénées-Orientales. The sulphur springs were famous in anct. times, and remains of Rom. baths are still to be seen. The resort is frequented in summer and winter by sufferers from rheumatism and consumption. In 1840 the name of the place was changed from *Bains d'Arles* in honour of Queen Marie-Amélie. Pop. 1247.

**Amelli**, **Guerrino** (1848-1933), It. critic and historian of sacred music, b. at Milan. Joined the monks of San Benedetto at Monte Cassino, assuming the name of Ambrogio. In 1881 he founded the *Associazione Italiana Santa Cecilia* and



Lomas

INTERIOR OF A ST. JOHN'S AMBULANCE

by the Fr. on the method of Larrey, e.g. a corps of stretcher-bearers was organised. In the Crimean war the Brit. had no systematic A. corps, and attention to this dept. was only given after Lord Herbert's commission of 1857-58. This method of first aid was subsequently adopted by other powers, and by the convention of Geneva (1864) the patients and the A. staff were secured neutral protection. The A. wagon of the Brit. Army prior to the First World War was a canvas-covered vehicle marked with the Geneva cross, and is now constructed to hold 4 stretchers and 6 men seated. It is light and adaptable for quick transport. During action stretcher-bearers pick up a wounded man as he falls, and he is then treated with first-field dressing. Thereafter he is carried on an A. wagon of the first line of assistance to the dressing-station. Should his wounds be of a serious nature, he is removed in a wagon of the second line to the field hospital. Thence, if necessary, he is conveyed to the general hospital or home in a hospital

the next year a higher school of sacred music in Milan. The movement was officially recognised by Pope Leo XIII in 1884 and had its triumph in the famous *Motu Proprio* of Pius X.

**Amen**, a Heb. liturgical word of affirmation. It is used as a response at the conclusion of a doxology, prayer, etc. Justin Martyr is the first of the fathers who speaks of this use of the response. The word varies in meaning according to its position. It has usually a final or detached position, and signifies 'So let it be.' The use in the gospels of the word A. (or more frequently the double A. trans. in the A.V. 'verily, verily') is peculiar. The 'flat' force of the word is there lost, and it serves merely to lay stress on some important statement about to be made.

**Amende Honorable** was in the old Fr. laws a public confession made by persons guilty of crimes coming under the head of public scandals, and was accounted an infamous punishment. It might also be a public acknowledgment of an injury to the reputation and honour of another; and in England the expression is used when a person publicly admits any wrong done to another.

**Amendment**, a legal term signifying the correction of mistakes in the written records of judicial proceedings. For A. in the sense used in parliament and public meetings, see **PARLIAMENTARY PROCEDURE**. In anct. times, after the proceedings were once entered on record, the judges considered that they had no authority by the common law to alter them in any respect, however trifling. This led to much inconvenience, for it frequently happened that one of the parties to a suit would discover some blunder in the record made by the officer of the court, and by bringing a writ of error deprived the successful party of all benefit from the judgment. The judges would appear to have been guided by this rigid observance of words by an ordinance of Edward I., which directed them to record the pleas pleaded before them, but forbids them 'to make their records a warrant for their own misdoings, or to erase or amend them, or to record anything against their previous enrolments.' The inconvenience of this rigid adherence to this ordinance led to a series of enactments called statutes of A. and statutes of *jofoils* (*jeo fail* or *j'at faille*), by the former of which authority was given to amend certain specific errors in the records, and by the latter judges were empowered to proceed to judgment notwithstanding such errors. The tenacity with which judges clung to their position of refusing to alter even the error of a letter in record or indictment (a position entirely laudable in principle) necessitated amending statutes from the time of Edward III. to the present day. Almost any A. is now allowed in civil causes, provided that the A. does not subject the defendant to a larger pecuniary liability or embarrassment or surprise him. In criminal

causes the practice is more stringent, and once the indictment has been formulated at the assizes no A. is allowed. This stringency does not apply to the early stages of a criminal cause in the magistrate's court, and it is for this reason that defence is so often reserved till after the committal of the prisoner to the assize court. The present law and practice of the courts is based mainly upon the Judicature Act, 1873, and, in Scotch courts, on the Court of Sessions Act, 1868.

**Amenemhat**, the name of 4 Egyptian kings of the XIIIth dynasty. See **EGYPT**—*The Middle Kingdom*.

**Amenhotep**, **Amenophis**, or **Ammenophis**, the name of 4 famous early Pharaohs of Egypt. A. I. (c. 1570 B.C.) was the son of Amasis I., conquered Ethiopia and subdued the Libyans. A. II., son of Thothmes III., fl. c. 1500 B.C. He devoted his reign to composing his kingdom and improving the architecture. A. III., son of Thothmes IV., fl. c. 1450 B.C. He also devoted his reign to building. He constructed the great temples at Thebes, of which the ruins of the temple of Luxor remain. The Vocal Memnon, mentioned in Herodotus and Tacitus, was built for him. A. IV. was Akhnaton (q.v.).

**Amenorrhoea**, see under **MENSTRUATION**. **Amentet**, in Egyptian mythology, the 'Hidden Land' or Egyptian Otherworld, and, like most places of the dead, situated in the W. with the setting sun. The chief dweller in A. is Osiris, in his form of a mummy. With him the dead are identified and aspire, like the sun god, to pass through A. to paradise.

**Amenthes**, the lower world of the anct. Egyptians. Thither the dead were conducted by the goddess Ma, and judgment was passed by Osiris on their deeds.

**Amercement**, or **Amerciament** (from the Fr. *à merci*, from the Lat. *merces*, payment), a term in Old Eng. law used to denote an arbitrary pecuniary forfeit imposed on an offender by a jury of his equals in status, or, if in the supreme courts, by the coroner. The amount of the pecuniary penalty was quite arbitrary, and was originally an alternative for a forfeiture of goods. The word in modern usages has practically lost its old technical sense, and is confined to poetical phraseology, where it has merely the meaning of a loss, fine, or deprivation of any kind.

**America**. The general name given to the 2 continents which form the W. hemisphere, extending approximately from beyond 75° N. lat. to below 55° S. lat. The name, derived from Amerigo Vespucci (q.v.), who only reached the mainland of N. A. sev. years after the discovery of the New World, is a historical accident. At the present day, 'America' and 'American' are often used as synonymous with the U.S.A., and a citizen of that nation respectively. As applied to both N. and S. A. the name is also anomalous, for the 2 continents have little in common and are all but

disconnected physically. Geologists, seeking an explanation of the grouping of the continents of the world in the tetrahedral deformation of the earth's crust, afford some justification for treating N. and S. A. as a single geographical unit. There is, however, a recognised tendency in all land masses to assume the form of pyramids, with their vertices directed towards the S. This is strikingly exemplified in the form of both N. and S. A. Again, in some respects the general outlines of both are similar, and both have ranges of volcanic mts. in the W. running almost due N. and S., and both are watered by similar great rvs. The physical features of both are on a vaster scale than the physical features of Europe. The rvs. are extremely long, the lakes very large, the prairies or *Panos* extensive. For the rest, however, the diversities are so great that it is more convenient to treat them separately. For the geology, ethnology, fauna and flora of A. see NORTH AMERICA and SOUTH AMERICA; for physical features, climate, products, manu., forms of gov., hist., etc., see CANADA, MEXICO, UNITED STATES OF AMERICA, and the various countries of CENTRAL AMERICA; and ARGENTINA, BRAZIL, CHILE, and other countries of S. America.

**America's Cup, The.** A silver cup given, in 1851, by the Royal Yacht Squadron for a race for any yachts at Cowes, Isle of Wight. There were 15 competitors and it was won by an Amer. yacht called *The America*, of 150 tons. It has since been offered as an international prize to any yacht-owner of another nation who can win it under certain rather severe rules. Many unsuccessful attempts have been made by Brit. yacht-owners in Amer. waters to bring the trophy back to England. Sir Thomas Lipton built and raced no fewer than 5 yachts. His *Shamrock IV*. was beaten in 1920 and after 10 years' interval *Shamrock V*. failed in 1930. *Endeavour* (T. O. M. Sopwith) lost to *Rainbow*, 1934; *Endeavour II*. (T. O. M. Sopwith) lost to *Ranger*, in 1937.

**American Association for the Advancement of Science** was the name given in 1847 to the new organisation of the former 'Association of American Geologists and Naturalists.' The first meeting of the new association was held on Sept. 20, 1848, and at this meeting the rules were drawn up. The objects of the Association are, 'by periodical and migratory meetings, to promote intercourse between those who are cultivating science in different parts of the U.S.A., to give a stronger and more general impulse and a more systematic direction to scientific research; and to procure for the labours of scientific men increased facilities and a wider usefulness.' Members may be chosen from among the collegiate profs. of natural hist., physics, chem., and mathematics, and political economy, and of the theoretical and applied sciences generally; also civil engineers and architects who have been employed on

the construction of superintendence of public works. In addition, a number of independent organisations and societies are affiliated, and these meet, at about the same time as the larger association, for the reading of papers, etc. The activities of the association cover a variety of subjects under the following heads: agriculture, astronomy, anthropology, botany, chem., economics, education, engineering, geology and geography, hist., mathematics, medicine, philology, physics, psychology, and zoology. The large income which accrues from the permanent endowment of the association is mainly granted in aid of scientific research. The headquarters of the association are at the Smithsonian Institution Buildings, Washington. The present number of members is about 20,000.

**American Blight**, a pest very common to apple-trees. It may be easily recognised by its dark brown colour and white covering. Spraying is essential to get rid of it.

**American Civic Association**, formed in 1904 by the amalgamation of the Amer. League for Civic Improvement and the Amer. Park and Outdoor Art Association. Its object is to combine and render efficient all effort for civic betterment. It claims, *inter alia*, to have prevented the exploitation of Niagara Falls for power purposes, and it conducts campaigns against objectionable outdoor advertising and against the 'typhoid' fly, and fosters parks and playgrounds. Among other activities may be mentioned the planning of parks and boulevards, the abatement of smoke in tns., tree-planting, and tn.-planning.

**American Civil War**, see U.S.A.

**American College Yeh**, see CHEERING.

**American Federation of Labour**, a powerful combination of craft and industrial unions, founded in 1881 in Pittsburgh, Pennsylvania, which took the place of the Knights of Labour founded in 1869, which latter body in the middle eighties had a membership of 700,000, conducted a large number of strikes, and then quickly declined. The A.F.L. was led by Samuel Gompers, a shrewd organiser of Brit. birth and Dutch-Jewish blood. Its policy was, from the first, conservative; it took the capitalist system for granted; and it made astute bargains with employers with as little reliance on the use of strikes as possible. No distinction of nationality, creed, or colour was to affect the rights of membership. By 1900, labour, under the aegis of the A.F.L., had become a power that no statesman could ignore. Its ceaseless agitation the federation has effected many far-reaching reforms, such as the compulsory education of the young, compensation for accidents to employees in industry, and health and sanitary regulations for all workers. The suppression of competitive convict labour and the restriction of alien immigration are also the results of its efforts. In the First World War the federation gave whole-hearted support to the proposals to defend the U.S.A. against all enemies

by advocating the personal services of its members. During the era of Roosevelt's New Deal the A.F.L. continued to represent most of the large craft unions; but beside it then arose a powerful new organisation, the Congress of Industrial Organisations (C.I.O.), which represented unskilled workers and labour in the mass-production industries. Under the C.I.O. collective bargaining received a new impetus; but there has inevitably been some rivalry between the 2 bodies. In foreign affairs the federation has supported Amer. participation in the World Court; the limitation of armaments; and Philippine independence—mainly to stop the immigration of Filipino labour. In general the A.F.L. has been strongly opposed to Fascism wherever it appeared. In 1933 it voted a boycott of Ger. goods and services until the Ger. Gov. recognised the rights of the working people of Germany to form independent trade unions; and in 1935 it voted concurrence with the League of Nations in declaring Italy an outlaw nation. In 1940 the federation came out strongly for full aid to Great Britain. There is now a labour dept. and employment bureau in each of the Amer. states. The federation's official organ is the *American Federationist*.

**American Independence, War of, see UNITED STATES OF AMERICA—History.**

**American Indians,** the aboriginal pop. of America. The application of the word Indian to this race is a misnomer due to Columbus's belief that he had found a new route to India. The name was preserved, only subsequently Amer. was added to distinguish the people from the quite different races of India. Some ethnologists have coined a new word, 'Amerind,' which name has some currency. With the exception of the Eskimo race, the divers tribes of A. I. are remarkably uniform in type, and even the Eskimo and Indian tribes have at least kinship in language, i.e. the various languages are characterised by 'long words' whereby a whole phrase or sentence is compressed into one long compound. Such a language is called holophrastic.

**Original Numbers and Causes of Decrease.**—The best available statistics indicate that at the time Columbus landed there were living in what is now the U.S.A. approximately 846,000 Indians. By 1900 the pop. was reported as 270,000, and apparently had at one time dropped even below this point. Some notion of the causes of Indian declination is to be gathered from the bulletins of the Bureau of Ethnology in which James Mooney states: 'The chief causes of decrease, in order of importance, may be classed as smallpox and other epidemics; tuberculosis; sexual diseases; whiskey and attendant dissipation; removals, starvation, and subjection to unaccustomed conditions; low vitality due to mental depression under misfortune; wars. . . . One historic smallpox epidemic, originating on the Upper Missouri in 1781-82, swept northward to Great Slave Lake, eastward to

Lake Superior and westward to the Pacific. Another in 1801-2 . . . reduced the strength of northern plains tribes by nearly one-half. A fever visitation about the year 1830 was officially estimated to have killed 70,000 Indians in California. . . . The destruction by disease and dissipation has been greatest along the Pacific coast, where also the original population was most numerous. In California the enormous decrease from about a quarter of a million to less than 20,000 is due chiefly to the cruelties and wholesale massacres perpetrated by the miners and early settlers. . . . Wars in most cases have not greatly diminished the number of Indians.'

**Ethnology.**—The average Indian is marked by abundant straight black hair, not frizzled and woolly; copper-coloured skin (whence the name Red-skin and Red man, a peaked skull, aquiline nose, prominent jaw, and tall, massive frame. He is naturally serious in his views of life. In character he is brave, proud, and generous, but very vindictive. Ethnologists for the most part agree that the aboriginal inhabitants of America are of Asiatic descent. In the region of the Bering Strait the 2 continents approach very close together and the passage is simple. Moreover, resemblances in physique, language, and customs all point to racial unity. The contact of the A. I. with European races was for long very destructive to the former. The atrocities committed by the Sp. pioneers have long been a subject of shame to all white peoples. The A. I. do not easily withstand diseases not endemic, and countless natives succumbed to plagues introduced by the Europeans. Fire-water (alcohol) had fatal effects on the constitution of the aboriginals. Whole tribes were thus exterminated, and the great percentage of those who survived lost the civilisation that had reached a considerably high level in their free days and lapsed into savagery. Later the cruelties which had been inflicted on the people were recognised, and a new treatment was organised, which unfortunately proved almost as vicious as the old. The donation of annuities to deported tribes only effected degeneration and pauperisation. Of the pure-blooded A. I. not very many remain. The natives have amalgamated with almost every race. This admixture makes it very difficult to rebuild the fallen structure of pure A. I. civilisation. But to-day the curve of Indian pop. has taken a sudden upward swing and the drift towards assimilation has apparently slowed down. And with these changes in the current of native existence has come a revival of Indian culture, Indian economy, and Indian spirit, the fruits of which no one can accurately foretell.

**Arts and Crafts.**—The main employments of the people were agriculture and hunting. Before the advent of the Spaniards, beans, melons, potatoes, Indian corn, tobacco, cotton, were all

cultivated systematically. Hunting was facilitated by means of intricate and ingenious snares and nets. Spears, bows and arrows, harpoons, and clubs were the chief instruments employed. Sledges and skin-boats (coracles) were the chief means of transportation, and wheels were but little used. Arts and crafts were developed to a high degree. Spinning and weaving were practised with no mean skill. Shells were strung in patterns with or without the addition of porcupine quills. The glass-bead work so often exhibited among native articles is of a much later development. The materials for this work were introduced by the Europeans, and the nature of the work is very tasteful to the Indian. Gold, silver, and iron were worked and manufactured into utensils and various articles of personal adornment. Painting, too, had reached considerable development and adorned articles made of skin, bone, and pottery. But the art that was nearest and dearest to the A. I. was the art of music. Music echoed every phase in the life of the native, and was thus of a very diversified character. There was gruesome war music, wild dance music, sweet love music, thrilling hunting music, and music for seed-time and harvest, music to which to eat, to sleep, and to perform all the little duties of ordinary life, however humble. No other peoples have music with such a wide range. The chief musical instruments known to the Indians, before the advent of the white, were drums, flutes, and rattles.

**Religion.**—The religion of the A. I. is on the whole pantheistic, yet in certain respects it approaches very near monotheism. Divine power is manifest in all the operations of nature, revealing itself in energy. This power was sometimes separately worshipped, according to the various phases in which it manifested itself, and a sort of spirit-worship arose. All the minor spirits had to be honoured and appeased with their own appropriate worship. But sometimes this divine power was regarded in its oneness as the principle and origin of all life, infinite in power and eternal in duration. The A. I., inasmuch as he recognised an omnipresent, omniform God, regarded everything in the light of religion; and just as in his love of music he considered no experience unworthy of musical expression, so, too, in his religious life he considered no aspect of nature and life outside the pale of divine manifestation. Music, in fact, is the expression of the religious feeling of the A. I. The soul of the individual was regarded as being immortal, inasmuch as it was a portion of the life-principle, itself indestructible. In addition to their recognition of this divine power dominating all that is, most tribes recognised their own peculiar demigod. This demigod was for the most part beneficent and benevolent, and was the guardian of the welfare of the race. He was the embodiment of the principle that makes

for righteousness, and herein lies the great superiority of the religion of the A. I. over most savage religions—the development of the race was regarded as progressive and not retrogressive.

**Social Organisations.**—Social organisations varied according to the nature and state of advancement of the diverse tribes. Sometimes the state was almost communistic in principle, sometimes the powers of chieftainship were absolute. The race on the whole was monogamous. No traces can be found of human sacrifices and cannibalism. Such was the state of civilisation among the A. I. before the advent of the white men—a state far removed from savagery. In a very few years this state of civilisation entirely disappeared, leaving only a few traces in names and expressions adopted by the European. The old Indian trails were used by the white settlers and greatly facilitated their progress in the W. Too much stress cannot be laid on the debt the white men owe the red in this direction. So sudden was the reversion of the A. I. to savagery, so rapidly did their numbers decrease, that it was long before their ancient civilisation was realised and attempts were made to reclaim their fallen state. Cortés and the early Sp. invaders totally ignored their claims to humane treatment, though they witnessed the highest level of civilisation and advancement among the Indians. The Sp. pioneers were regarded as gods—children of the sun. Advantage was taken of the ignorance of the people, and whole tribes were massacred to glut the Sp. greed for wealth. The rich gold ornaments and jewels of the Peruvians proved as attractive to Francisco Pizarro, the conqueror of Peru; nor did Pizarro fail to equal the atrocities of Cortés. As late as the nineteenth century compassion was taken on the miserable remnant of a great people, which had survived European cruelty and European disease, but the reservation system was almost as destructive as the former cruelty. Only lately, when educational methods have been put in force, have the possibilities of the race been realised. The occidentalisation of the red men in recent times has been rapid and full of promise. Most promising is the taste of the A. I. for letters. An Indian is able in a remarkably short time to read and write in his own language. When one considers the imaginative faculties of the Indian, his love of music, and his reverence for life, one can easily recognise that the literary potentialities of the people are great, and much is to be looked for in the future.

**Present Conditions on Reservations.**—For a very long time the education of the A. I. has been of constant interest and the plan of many public-spirited bodies and individuals, but it is only comparatively recently that there has been any great response. It is not generally known that the original charter incorporating Harvard Univ. contains special

provision for the education of Indians, while as long ago as 1873 the Amer. Gov., in the arrangements for Indian reservations, estab. boarding and day schools. Education of a rather higher nature was not seriously entered upon until the Indian School was started at Stockbridge, Massachusetts, in 1890. The younger generations of Indians are now making rapid advances, and, particularly in the S., are equipping themselves with professional knowledge and skill. During the last few decades the discovery of oil in the S. settlements and reservations has made the resident Indians enormously rich, so that there is now a great line of cleavage between them and their compatriots in the N., who still remain a poor race. This increase of wealth has had consequences that as yet can scarcely be measured. Money tells in America, and the rich Indian scarcely feels himself a member of a conquered and dying race. On the whole it would appear that the efforts of these new rich are directed towards becoming good citizens and, in the younger generation, the college and the univ. are the selected means. An important point should not be overlooked in any discussion of the A. I., that the average Amer. citizen feels more kindly towards him than towards any of the 'other' races. It is not forgotten that he was the original owner of the soil, and now that he has ceased to hamper the advance of civilisation his rights are more fully recognised. This is exemplified by the fact that the veto on intermarriage of races is not in such strong evidence against Indians as against Negroes and Asiatics. Indeed, many contend that a drop of Indian blood improves the stock, and admit that the early settlers from whom good families spring intermarried with Indians. This attitude towards the Indians is, however, of comparatively recent date, and, in spite of laws that seemed fair, they were subjected to shameful mis-treatment for a considerable period. Even now Indian administration presents serious problems in regard to economic and social conditions among the tribes. In the U.S.A. (1946) there are estimated to be 398,000 Indians, excluding Indians and Eskimos of Alaska. Of the 398,000 about half are full-blooded Indians and the remainder mixed with whites in varying degrees and, in the case of a few tribes, with Negroes. There are more than 200 distinct tribes living in 27 states, most of them W. of the Mississippi R.; the largest number being in Oklahoma, Arizona, and S. Dakota. Of the total Indian pop. all but a very few are to a greater or less degree wards of the Federal Gov., and most of them live on Indian lands set aside for their use by the Gov. Congress appropriates annuities ranging from 12,000,000 to 18,000,000 dols. for Indian affairs, and the Dept. of the Interior, besides administering these appropriations, acts as trustee for the very large amounts of Indian tribal moneys accruing from mining and oil

rentals or other sources of income. In 1928 the Institute for Gov. Research issued the most comprehensive report (the Meriam Report) on economic and social conditions among the A. I. yet produced, and many of the recommendations of that body have been carried into effect, notably for the improvement of sanitary conditions of the reservations, the prevention of overcrowding in schools, the improvement of diet and hygienic conditions of work. Publication of the Meriam Report was followed by a long investigation by a committee of the U.S. Senate whose voluminous hearings and exposures heralded reforms to come. Under the administration of a new body of commissioners, pledged to a programme of reform, the groundwork was laid for a new policy, embodied in the Indian Reorganisation Act, 1934. President Roosevelt, in urging the enactment of this measure, wrote: 'Certainly the continuance of autocratic rule, by a federal department, over the lives of more than 200,000 citizens of this nation is incompatible with American ideals of liberty.' Good progress has been made, especially by the Indians of the Kiowa and Comanche reservations, in securing better homes. The health of Indians still remains a difficult problem; trachoma, tuberculosis, and the diseases of childhood are prevalent, and recently Indian pupils have been separated in trachoma and non-trachoma schools, while many new hospitals and more adequate equipment have had to be provided. The right of citizenship was conferred on A. I. only in 1924; this gives the suffrage to all Indians born in the U.S.A. The commonest occupations of the Indians of to-day are farming and the raising of cattle and horses; while many are engaged in the making of blankets and pottery and in embroidery, the chief market for the sale of their handicrafts being among tourists.

*Indians in Canada.*—Indians are minors under the law, and their affairs are administered by a special branch of the Dept. of Mines and Resources under the authority of the Indian Act. Reserves have been set aside for the various bands of Indians in Canada since the earliest times, and the Indians located on them are under the supervision of the local agents or the departmental branch. The activities of the branch, as guardians of the Indians, include the control of Indian education, the care of health, the development of agriculture and other pursuits among them, the administration of their funds, and the general supervision of their welfare. The Indian Act provides for the enfranchisement of Indians. When an Indian is enfranchised he ceases to be an Indian under the law. In the older provs. where the Indians have been longer in contact with civilisation, many are becoming enfranchised, but great discretion is exercised by the Gov. in dealing with this problem. Indians who become enfranchised lose the special protection attached to their wardship, so that premature enfranchisement must be

avoided. There are approximately 128,000 Indians and Eskimos, of whom over 30,000 are in Ontario, 25,000 in Brit. Columbia, 15,000 each in Manitoba, Alberta, and Saskatchewan, and 12,000 in Quebec.

See also under separate names of tribes: ALGONKIN; COMANCHES; CHINOOKS; CHIPPEWAYANS; CHIKOTOS; CHOC-TAWS; IROQUOIS; MOHAWKS; MUSHKOGES; ONEIDAS; SEMINOLES; SHOSHONES; TUSCARORAS. See R. Karsten, *The Civilisation of the South American Indians*, 1926; D. Jenness (ed.), *The American Aborigines: their Origin and Antiquity*, 1933; E. M. Weyer, *The Eskimos: their Environment and Folkways*, 1933; W. M. Halliday, *Pollatch and Totem*, 1935; C. Wissler, *The American Indian*, 1938; J. Collier, *The Indians of the Americas*, (New York), 1947.

American Institute of Social Service, organised in 1898 to gather and spread information in all branches of social thought and service. Publishes *The Gospel of the Kingdom*. Headquarters, Astor Place, New York.

American Law, see UNITED STATES OF AMERICA—Law; see also ACTION; EVIDENCE; etc.

American Legion, an organisation of Amer. ex-service men, somewhat similar to the Brit. Legion, with patriotic and other motives of a high order. It was inaugurated in 1919. The idea originated among the troops in France. All ex-servicemen who served between Apr. 6, 1917, and Nov. 11, 1918, in the naval and military forces of the U.S.A. or associated powers are (generally) eligible for membership. The legion led a protracted and bitter campaign for a bonus for Amer. veterans.

American Literature, see UNITED STATES OF AMERICA—Literature.

American Scenic and Historic Preservation Society, founded by Andrew H. Green, and incorporated 1895, for the protection of natural scenery, the preservation of historic landmarks, and the improvement of cities.

American War of Independence, see UNITED STATES OF AMERICA—History.

Americanism, a word or phrase originating among the people of the U.S.A., and obtaining general currency there. Some so-called As. are merely Eng. words which have had applied to them a different meaning from that in use in England. For instance 'corn' in America is applied only to Indian maize, whereas in Great Britain it is applied to all cereals. Some other As. are of perfectly good Eng. origin, but have dropped out of current usage in Great Britain. Where Eng. people use the word 'autumn' of Lat. origin, Amers. commonly use the old pure Eng. word of 'fall', which is at once more apt and more poetic—the time of the fall of the year, the time when the leaves fall. Similarly, Amers. say 'guess' for 'think', 'hefty' for 'sturdy' or 'stalwart', 'fetch' for 'bring'.

In another sense As. reveal the story of the colonisation of the ter. that is now the U.S.A. by various European nations, and

also of the relics of the native Amer. Indians whom they dispossessed. Thus of Indian origin are such common words as 'canoe', 'hominy', 'tomahawk', 'pemican', 'toboggan', 'pow-wow', 'wigwag', and the very expressive Eng. word the Indians invented to describe whisky, 'fire-water.' Traces of Fr. colonisation in the U.S.A. are shown by words like 'prairie' and 'bayou.' The Spaniards left their mark in words like 'mustang', 'adobe', 'canyon', 'mesa.' But the greater part of As. is of purely Amer. origin, growing out of the life of the people, their business, their politics, which are different from those in England. Amer. trade has altered the stereotyped vocabulary by a system of curtailed words, or words illustrating new methods of commerce. Amers. have decided inventive genius, and have been just as skilful in creating new names for their new discoveries. The number of patented articles in America is enormous, and many of these have their own made-up names which have passed into current usage. There are many As. which originate as mere slang expressions, then become generally current in America, and finally secure a place even in the Eng. language as spoken in Great Britain. Such are, for instance, 'boodle' for money obtained illegally, particularly by politicians; 'bunkum (q.v.) platform', for a political party programme; 'plank', for an important section of that programme. The prohibition law in America, and the consequent and successful attempts to evade it gave rise to a whole series of new words. Thus 'blind tiger' meant a place where alcoholic liquor was sold despite the law; 'bootlegger' was a man who made a profession of selling liquor illegally, 'hooch' was the name generally given for the stuff that was sold as whisky in the U.S.A. after prohibition came into force.

There are many As. which are to-day in the transitional stage. Now they are mere slang. To-morrow they may be universally adopted or drop out entirely. The origin of many of these is obvious. Thus 'also ran' means an unsuccessful contestant, evidently adapted from the racecourse term. 'Boll-weevil', from being the name of a pest that destroys the cotton plant, has evolved into a term for any obnoxious person. 'Tight-wad' means a stingy person, obviously because he keeps his wad of paper money unspent. 'Gold-digger', originated in the Broadway theatrical district of New York City. It originally meant chorn-girls who wheedled money and presents out of male admirers. It now means any woman who does the same. 'Hen-party' obviously means a party composed entirely of women. 'Muck-rake' (which comes from *Pilgrim's Progress*) to the agile Amer. mind quite obviously suggested obtaining secret and unsavoury data about institutions and public officials. 'Ittzy' is a perfect laboratory example of how Amer. slang originates. At one time in America the Ittzy hotels were supposed to be the last extreme of luxury and also of



costliness. People who stopped at such hotels were supposed to be wealthy, and very likely to be snobs. Hence the word 'litzzy' means giving oneself airs. The origin of other As. is not obvious, and their life is also one of dubious duration. Thus 'apple sauce' for empty talk; 'fall guy' for one who is made a tool of; 'fathhead' for a stupid person (dates from 1842); 'make whoopee' for making unbridled and drunken revelry. There was a time when most As. were confined to America and known only there. But with the spread of both the Amer. silent and talking films, the average Eng. audience has picked them up and the younger people have at times adopted them. Amer. slang may often shock the purists. Some of it is coarse and some of it cheap. But it is one way a sign that the Amers. are in process of creating for themselves a language which steadily tends to differ from that spoken in Great Britain, not only by inventing new expressions, but also by giving old ones new twists applicable to a different continent. The same thing is observable among the Sp.-speaking peoples of S. America, where the language tends to differ from that spoken in Spain.

**Americus**, co. seat of Sumter co., Georgia, U.S.A. Manufs. cotton-seed oil and iron goods. Pop. 8800.

**Amerigo Vespucci**, see **VESPUCCI**.

**Amerling, Friedrich von** (1803-87). Austrian painter, b. in Vienna. His portrait of the Emperor Francis I., 1832, secured his position as the greatest portrait painter of his country.

**Amerongen**, vil. in prov. of Utrecht, Holland, which has gained notoriety solely on account of its association with the ex-Kaiser, William II. of Germany, who fled from the seat of the First World War on Nov. 10, 1918, and found asylum in the castle of Count Goddard Bentinck at that place. After his second marriage, the ex-Kaiser continued to reside in A.

**Amersfoort**, tn. of Holland, very old and retaining many of its medieval characteristics; its walls still stand in places. The Koppelpoort, a crenellated gateway with bridge and water-port, is one of the most picturesque gateways in Holland. A church tower built in 1441, 112 ft. high, contains a carillon of 35 bells. Many manufs. Pop. 46,200.

**Amersham**, a mkt. tn. in Buckinghamshire, 7½ m. E.N.E. of Wycombe and about 20 m. W.N.W. of London. Straw-plaiting and chair-making are the prin. industries. Edmund Waller the poet was b. in the vicinity. Pop. 6100.

**Amery, Leopold Charles Maurice Stennett**, b. 1873. Brit. politician and publicist. Organised *The Times* war correspondence in S. Africa (1898-1900). Author of *The Times History of the S. African War* (7 vols.), which was completed in 1909. In the First World War was assistant secretary of the War Cabinet in 1917 and on the staff of the War Council at Versailles in 1917-1918. Was First Lord of the Admiralty

in 1922 and afterwards, in Mr. Baldwin's administration, secretary of state for the dominions and colonies, in which capacity he has twice presided over the Imperial Conference. Has a good knowledge of the empire, having travelled widely in the E. and, after the war, in the Dominions. As secretary of state for India in Mr. Churchill's Cabinet (1940) it fell to him to formulate a plan for Indian self-gov., while India was actually being invaded by the Jap. An adherent of the anti-appeasement group in the Conservative party in 1938 and 1939. Publications include: *The Stranger of the Ulysses* 1934; *The German Colonial Claim*, 1939; various collected speeches and lectures on imperial affairs and the constitution; *India and Freedom*, 1942; and, autobiographical, *Days of Fresh Air*, 1939, and *In the Itain and the Sun*, 1946. See also **CRIPPS**, **SIR STAFFORD**; **INDIA—History**.

**Ames, Fisher** (1753-1808), Amer. orator, b. at Dedham, Massachusetts. After graduating from Harvard in 1774, practised law and became famous for his articles on Shay's rebellion. Elected to Congress, 1788, and later served on the Massachusetts Council. His works were pub. by Seth Ames, his son, in 1809.

**Ames, Joseph** (1689-1759), a bibliographer and antiquarian, was b. at Yarmouth. The nature of his trade is doubtful, but it was lucrative. A., at the suggestion of the Rev. John Lewis of Margate, undertook to write a history of printing in England from 1471 to 1600—his famous *Typographical Antiquities*. To facilitate his research he circulated a preliminary list of 215 Eng. printers with a request for information concerning their lives and work. This book is of great value to bibliographers. It was pub. in 1749.

**Ames, Joseph** (1816-72), Amer. painter, b. in New Hampshire, U.S.A., and d. at New York. He was self-educated, and from the proceeds of his portrait-painting he managed to go to Rome to study. There he painted a fine portrait of Pius IX. His career was brilliant, and among his best portraits are those of Emerson, Ristori, Prescott, Cornelius Felton, and Rachel. Of his historical paintings the best known are 'The Death of Webster' and 'Maud Muller.'

**Ames, William** (1576-1633), a Puritan divine, b. at Ipswich. At Christ's College, Cambridge, he came into conflict with the authorities on account of his non-conformity and outspoken denunciations of univ. excesses. He took refuge in Holland, and, clothed as a fisherman, he resumed preaching. At the synod of Dort he was the most active and influential of the foreign divines. Installed at Franeker (1622) he brought renown to his pastorate there as prof., preacher, and theologian. His health gave way after 12 years and he accepted a charge at Rotterdam, where he wrote an epoch-making book in Protestantism, *De conscientia et ejus fure vel casibus* (*Fresh Suit against Ceremonies*), 1630. In this book

he brought Christianity again in touch with the common things of life: by its influence Richard Baxter enlisted on the side of the nonconformists.

**Amesbury:** 1. A small tn. in Wiltshire. St. Mary's church is of quaint Early Eng. architecture. Near the tn. is A. Abbey, the old residence of the dukes of Queensberry, which was built by Inigo Jones. Stonehenge and a rampart of the Rom. period are also near by. Here was erected in 980 the nunnery of Ethelfrida, wife of King Edgar. Pop. 1500. 2. A tn. in Essex co., Massachusetts, U.S.A., 42 m. N.E. of Boston. Settled as New Salisbury in 1654, and incorporated under present name in 1666. The home of J. G. Whittier the poet for over 50 years. Manufs. cotton goods and motors. Pop. 10,900.

**Amethyst**, a species of quartz characterised by its beautiful violet, purple, or blue shades. According to the popular etymology, the word comes from the Gk. *amethystos*, to intoxicate, the stone having the supposed virtue of warding off intoxication. The violet colour is said to be due to the presence of manganese, but modern chem. inclines to discredit this. A tinged quartz has a very wide distribution, but pure A. is confined to a comparatively small area—India and Ceylon chiefly. In Scotland A. is found, and it is one of the most popular stones in old Scottish jewellery.

**Amharic**, the language of the inhab. of Amhara, and spoken throughout Abyssinia with slight variations according to dialect. The basis of the language is the old Semitic tongue called the Ethiopic or Geez.

**Amherst:** 1. A vil. about 30 m. S. of Moulmein in Lower Burmah, founded by the Brit. in 1826 and named after the then governor-general of India, but now merely a fishing vil. and bathing-place for Moulmein. 2. A tn. in Hampshire co., Massachusetts, which has an important Congregational college. Pop. 6400. 3. The co. tn. of Cumberland co., Nova Scotia, Canada. It is a manufacturing centre and port of entry. Pop. 8600.

**Amherst, Jeffrey, Baron** (1717-97), b. at Riverhead, Kent. Through the influence of the duke of Dorset he obtained an ensigncy in the Guards. His career was brilliant, and in 1758 Pitt appointed him commander-in-chief in the expedition for the conquest of Canada. For the success of the enterprise A. and Wolfe are mainly responsible.

**Amherst, William Pitt** (1773-1857), nephew of the former. He was sent on an embassy to China in order to procure better terms for commerce between Great Britain and that country, but through his spirited refusal to perform the 'kow-tow' (a degrading ceremony) to the emperor his embassy failed. In 1823 he was made governor-general of India, and held that office till the year 1828. He conducted the first Burmese war with great success, and was awarded the earldom of Arakan.

**Amherstburg**, a tn. in Ontario, Canada, on the N. shore of Lake Erie.

It has a good harbour and does a considerable trade in timber. Pop. 2800.

**Amianthus** (Gk. *ἀμιαντος*, undefiled) : white variety of asbestos (q.v.).

**Amice** (Lat. *amictus*, a wrap), an oblong piece of linen used as a vestment by priests, bishops, etc. It was originally worn like a hood over the head, but afterwards covered only the shoulders and neck.



AMICE

**Amicis, Edmondo de** (1816-1908), It. novelist, essayist, poet, and writer of travel-books. He was master of a delightful style, and in some of his works, especially his books of travel, exhibits remarkable descriptive powers. His chief publications are *Bozzetti della Vita Militare*, 1868; *Novelle*, 1872; *Constantinopoli*, 1877; *Ricordi di Parigi*, 1879; *Poesie*, 1880; *Sull' Oceano*, 1889; *Memorie*, 1899; *Speranze e Glorie*, 1900; *Ricordi d'infanzia e di scuola*, 1901; *Una Tempesta in Famiglia*, 1904; *Nel Regno dell' amore*, 1907; *Ultime Pagine*, 1908.

**Amicus curiæ** (Lat., a friend of the court), a legal term denoting a disinterested person, who, at the hearing of a case, informs or corrects the court.

**Amides**, see ACID-AMIDES.

**Amidines**, organic compounds corresponding to the formula



where R is a radical. They may be regarded as being derived from the acid-amides by replacing the oxygen by the group NH. They may be prepared by the combination of nitriles with ammonia and primary amines. The chief A. are formamidine, acetamidine, and benzamidine.

**Amido-Naphthalene**, see NAPHTHYLAMINE.

**Amiel, Henri Frédéric** (1821-81), a Swiss philosopher, b. at Geneva. In 1841 he became prof. of aesthetics at the Geneva Academy. He afterwards became prof. of moral philosophy in the same univ. The work which secures his fame is the *Journal intime*, which Mrs. Humphry Ward trans. into Eng., 1885.

**Amiens**, an anc. city, cap. of the dept. of Somme, N. France, and situated on the Somme at its confluence with the Arve. The chief interest of the city is Notre Dame, its magnificent cathedral, the most perfect specimen of Gothic architecture in France, dating from the thirteenth century. This splendid structure is embellished with a wealth of magnificent medieval sculpture. Viollet-le-Duc happily calls it 'the Parthenon of Gothic architecture.' The nave is remarkably lofty, and the columns are correspondingly grand. In the newer portions of the tn. are flourishing manufs. of linen, cotton, silk, and wool. A. is a famous market gardening centre, and the produce has a very extensive sale. Pop. 84,700. This city was the scene of the peace of

A., 1802, where the claims of England, France, Spain, and Holland were settled. By it Britain acknowledged the new claims of France in Europe, and agreed to give up her late conquests excepting Ceylon, captured from Holland in 1796, and Trinidad, which she took from Spain in 1797, and to restore Malta to the Knights of St. John. The Peace of A. was concluded in 1264, Louis IX. of France acting as arbiter between Henry III. of England and Simon de Montfort. Louis IX. took the side of Henry, and the Provisions of Oxford were declared null and void. This famous city was often threatened, but never taken by the Gers. in the First World War. In the second battle of the Somme (1918) it was clearly the main object of the enemy to reach the city, an inference which was drawn from the fact that the weight of its attack fell upon the ill-fated Brit. Fifth Army. On the sixth day of the battle (Mar. 26) the danger of the Gers. reaching the city and driving a wedge between the Brit. and Fr. armies was very present, for Gen. Haig had ordered his last reserves to the threatened point and it was doubtful whether it could send up Fr. reinforcements in time. Fortunately the Gers. could not sustain the momentum of their attack and were exhausted by the protracted and stubborn resistance of the allied armies, which, as a result of the Doullens conference, were, at the height of the crisis, put under the supreme command of Foch. On Apr. 24 the Gers. made a last attempt to break through to A., and for a short time were actually in possession of Villers-Bretonneux only 9 m. to the E. But the Brit. Fourth Army, under Gen. Rawlinson, who had been put in command on the A. front on Mar. 28, brilliantly counter-attacked on Apr. 24, recaptured Villers-Bretonneux, and so closed the gate to A. In the following Aug., after Foch had assumed the offensive, Haig attacked the enemy on the A. front (Aug. 8). In the battle of A. he attacked with the 3rd Brit. Corps, the 33rd Amer. div., and the Australian and Canadian Corps of Rawlinson's army, the W. front of the 11-m.-wide salient made by the Gers. the previous Mar., while Gen. Debeney, acting under Haig's orders, attacked some 4 m. southward of the salient. On that day (Aug. 8) 2000 guns were gathered on the Fourth Army's front of attack and they opened the bombardment almost simultaneously. Under cover of a favouring mist, the tanks, followed by the assaulting troops, burst through the Ger. lines in one irresistible torrent. Over 200 tanks, the development of which had by then been greatly improved since the battles of 1916, were used in the first line, and as many more were in support. Demoralisation spread in the Ger. ranks, and by Aug. 10 the dominion troops, aided by the Cavalry Corps, had pierced the Ger. lines to a depth of 12 m. It is worthy of note that

Ludendorff himself says that 'Aug. 8 was the black day in the list of the Ger. Army.' (Consult Maj.-Gen. Sir F. Maurice's *The Last Four Months, 1918*.) In the Second World War A. fell to the Gers. in the early summer of 1940, at which time, and afterwards, considerable damage was done to the city. It was liberated by the Brit. 21st Army Group at the end of Aug. 1944.

**Amilcar**, see **HAMILCAR**.

**Amines**, organic substances formed by the replacement of one or more of the hydrogen atoms of ammonia by an equivalent number of univalent organic radicals, such as alkyl groups (*q.v.*) or those derived from benzene (*e.g.* phenyl,  $C_6H_5$ , groups). They are divided into primary, secondary, and tertiary A. according to the number of hydrogen atoms displaced by radicals. Primary A. are methylamine,  $NH_2CH_3$ , ethylamine,  $NH_2C_2H_5$ , etc.; secondary A. are dimethylamine  $NH(CH_3)_2$ , diethylamine,  $NH(C_2H_5)_2$ , etc.; and tertiary A. are trimethylamine,  $N(CH_3)_3$ , triethylamine,  $N(C_2H_5)_3$ , etc. Among the aromatic amines, aniline or phenylamine,  $C_6H_5NH_2$ , is the most important.

**Aliphatic A.** are formed when an alcoholic or aqueous solution of ammonia is heated with an alkyl halide, the alkyl group taking the place of one atom of hydrogen in the ammonia. When excess of ammonia is employed all 3 A. are formed, but it is often possible by adjusting the proportion of ammonia and the time of the action to obtain a given A. as the main product, whence usually by fractional distillation the smaller quantities of the others can be eliminated. The 3 A. may be distinguished by their behaviour towards nitrous acid, primary A. yielding alcohols with evolution of nitrogen, secondary A. yielding yellowish liquids called nitrosoamines, whilst tertiary A. are unacted upon or oxidised. Aromatic A. are prepared by the reduction of nitro-compounds; thus nitrobenzene,  $C_6H_5NO_2$ , yields aniline on reduction with tin and hydrochloric acid.

The lower aliphatic A. are inflammable gases, very soluble in water; and the higher members are liquids with low boiling points, and are miscible with water. Many have a curious odour of boiled lobster. Methylamine occurs in 'perennial mercury,' and dimethylamine and trimethylamine are constituents of herring-brine. Many of the very poisonous ptomaines (*e.g.*, *putrescine* and *cadaverine*) are A. Aniline (*q.v.*), toluidine, and benzidine are among the chief aromatic A.

**Aminoisocaproic Acid**, see **LEUCINE**.

**Amiot, Père Joseph** (1718-94), a learned Fr. Jesuit, was b. at Toulon and d. at Peking. He was sent as a missionary to China, and arrived at Macao, 1750, and at Peking, 1751, where he lived until his death. His knowledge of Chinese and Tartar languages allowed him to interpret many obscure passages in the Chinese writers, and his works contain valuable information on China

and Chinese literature, arts, and hist. Among them are: *Art militaire des Chinois, 1772*; *Vie de Confucius, 1791*; and *Dictionnaire Tartare-Mantchou-Français, 1789-90*.

**Amir**, see **EMIR**.

**Amirante Islands**, i.e. Admiral Is., named after Vasco da Gama, their discoverer, a group in the Indian Ocean, S.W. of Seychelles, in lat. 5° S., long. 53° E. They are owned by Great Britain as a dependency of Mauritius. The scanty pop. supports itself by fishing.

**Amisia**, the Rom. name of the Prussian tn. of Ems; also of the riv. of the same name.

**Amissus**, see **SAMSUN**.

**Amjhera**, a tn. in Central India, situated in the opium-growing dist. of Malwa; pop. 97,000.

**Amlwch**, seaport of Anglesey, N. Wales, 15 m. N. of Beaumaris. Pop. 2720.

**Amman**, the cap. of Transjordan. Not many years ago it was a small Circassian vil. scattered over the ruins of a Græco-Rom. city famous for its well preserved theatre. The old cap., Es-Salt, has given place to A. largely because the latter, being near the Damascus-Medina railway, was a more natural centre. After the First World War the Brit. and the emir made their headquarters there and to-day a city of some 35,000 people fills the 3 valleys cutting across it and is now encroaching on the surrounding hills. On the plateau E. of the tn. above is an important station of the R.A.F. and in the broad valley below are the headquarters of the Transjordan Frontier Force under a Brit. pasha. The palace of the king and the Brit. residency are 2 solid buildings situated on the opposite crest.

**Amman, Johann** (1669-1730), Swiss physician, b. at Schaffhausen, and graduated at Basel in 1687. Began to practise at Amsterdam. An early authority on the teaching of the deaf and dumb, his method being to attract the attention of his pupils to the motions of the lips and larynx, and then to urge them to imitate these movements. His great work, *Surdus Loquens*, was pub. in 1692. He d. at Warmoud, near Leyden.

**Amman, Jost** (1539-91), Swiss painter and engraver. His productions are extremely numerous, but he is most remarkable for his engravings on wood. His original drawings are chiefly to be found at the Berlin Museum.

**Ammanati, Bartolomeo** (1511-92), It. architect and sculptor. He studied under Sansovino, and did much work for Pope Julius III.

**Ammanford**, a mkt. tn. of Carmarthenshire, 12 m. from Swansea, on the G.W.R. Has coal-mines and tin-plate works. Pop. 7000.

**Ammelide**, a substance obtained from ammeline. It is a white powder, insoluble in water, alcohol, and ether, but soluble by the alkalis and strong acids. Its formula is  $C_8H_8N_2O_4$ .

**Ammeline**, a substance obtained by

the action of hydrochloric acid on melam. It is of a splendid white colour, and is composed of very fine silky needles; it is insoluble in water, alcohol, and ether, but soluble in the caustic alkalis. When fused with potassium hydroxide, A. is converted into ammonia, and potassium cyanate. Its formula is  $C_8H_8N_2O_4$ .

**Ammonophis**, see **AMENHOTEP**.

**Ammeter**, or ampere-meter, an instrument for measuring the strength of an electric current in amperes (*g.v.*). In the best direct-current (D.C.) As., the current passes round a light coil pivoted so that it can rotate in a narrow gap between a soft-iron cylinder and the concentric poles of a horseshoe magnet. The current causes the coil to behave as though its faces were magnetised, and the coil therefore rotates to face the poles of the magnet, but its motion is resisted by delicate hair springs attached to it. The pointer of the instrument is carried by the coil, and the angle through which it rotates is directly proportional to the strength of the current. This proportionality is only achieved by the presence of the iron cylinder, which makes the magnetic field radial in direction, so that the pull on the coil is the same in all positions as it rotates.

In alternating-current (A.C.) As., the attraction of the moving coil is provided by the current flowing round a fixed coil. In this way the alternations of the current do not affect the direction of the attraction. Cheap As. of the moving-iron type depend on the attraction of a piece of soft iron towards the centre of a fixed coil round which the current flows, but for these and other As. such as thermal As., which depend on the heating effect of a current and are equally suited to A.C. or D.C. measurements, see R. T. Glazebrook (ed.), *Dictionary of Applied Physics*, 1923.

**Ammianus Marcellinus**, the last Lat. historian of the Rom. empire, lived some time in the fourth century A.D. He served in his youth in the E. and under Constantius II. in Gaul, and later accompanied Julian in his expedition against the Persians. In his later years he wrote, in 31 books, a hist. of the empire from the accession of Nerva to the death of Valens (96-378). Of this work (*Resur. Gestarum Libri XXXI.*) only 18 books remain, covering from 353 to 378. A. was a Gk., and his work is characterised by impartiality and insight. Ed. Gardthausen, Leipzig, 1875; Eng. trans. Yonge, Bohn's Classical Library.

**Ammir**, a kind of canoe at one time in frequent use in the highlands of Scotland.

**Ammirato, Scipione** (1531-1601), historian, came of a well-known family of Lecce, in the kingdom of Naples. On the advice of Braccio Martelli, archbishop of Lecce, he entered the Church, but on his patron's falling into disfavour with the pope his prospects of advancement were seriously diminished, and he settled down to a life of pleasure and study in Venice. An amorous intrigue

compelled him to leave the city, after which he travelled from place to place, finally securing the favour of the Medici in Florence. Here he received a commission to write the hist. of Florence. This work, entitled *Istorie Fiorentine*, appeared in 2 parts, the first in 1600, the second after his death, in 1641. Amongst his other works are: *Delle Famiglie Nobili Napolitane*, 1580; *Delle Famiglie Nobili Fiorentine*, 1615; *Discorsi sopra Cornelio Tacito*, 1591.

**Ammodytes** (Gk., sand-dwellers), a genus of carnivorous fish of the family Ammodytidae, or sand-eels, and subdiv. Malacopterygii of the order Teleostei. It is related to the mullets.

**Ammon**, later **Ammon-Ra**, i.e. A. the Sun, an Egyptian deity whose princ. city was Thebes. In the Libyan desert there was also an oracle known by his name. He is sometimes represented with the head of a ram, sometimes in human form wearing on his head a disk from which rise 2 tall feathers. His name is more correctly spelt Amūn.

**Ammon, Otto**, (Ger. anthropologist, was b. in 1842 at Karlsruhe, where he was educated. He is best known by his classification of country settlers in tns. into 2 groups, of 'round-headed' and 'long-headed,' the former attaching themselves to the commercial and industrial classes, the latter exhibiting a tendency to join the official and professional classes. This classification is known as 'Ammon's Law.' He is the author of *Die natürliche Auslese beim Menschen*, 1893; *Die Gesellschafts Ordnung und ihre natürlichen Grundlagen*, 1896; and *Zur Anthropologie der Badener*, 1899.

**Ammonal**, see EXPLOSIVES.

**Ammonia**,  $\text{NH}_3$ , a pungent-smelling gas; the name is also applied to the aqueous solution (spirits of hartshorn) and loosely to many of its compounds. It was known to the ancients as being produced by burning feathers and other organic substances, and the name owes its origin to the practice of distilling camel's dung in Libya near the temple of Jupiter Ammon. Many animal and vegetable products containing nitrogen give off A. when heated with the exclusion of air, especially if lime or any other alkali be added. In the distillation of coal, A. is produced and dissolved in the water through which the coal-gas passes. The liquid is then distilled with lime, setting free the A., which is passed into hydrochloric acid to form ammonium chloride, the 'sal ammoniac' of commerce. A. is also produced by the agency of bacteria from decaying animal or vegetable matter. It thus finds its way into surface water and into the atmosphere, where traces are usually found. A. is manufactured according to the Haber-Bosch process by heating a compressed mixture of nitrogen and hydrogen in the presence of certain finely divided metals such as iron and molybdenum.

A. is usually prepared on a small scale by heating together a mixture of 2 parts of

lime and 1 part of ammonium chloride; if needed in a gaseous form, it has to be collected over mercury or by upward displacement, owing to its great solubility in water. A. can be liquefied at  $0^\circ \text{C}$ . by the application of a pressure of 7 atmospheres, and the heat it absorbs in returning to a gaseous form causes a fall in temp. in surrounding objects which has led to its use for refrigerating purposes. In medicine A. is used as an antacid and as a heart stimulant in cases of fainting, hysteria, etc., though if breathed in large quantities it becomes injurious.

A. was at one time supposed to be the oxide of a metal to which the name of ammonium was given, but all efforts at producing it in a free state failed. In 1808 Seebeck discovered that if mercury is brought into a strong A. solution and an electric current passed through it, a spongy mass is formed, which was looked upon as an amalgam of mercury and ammonium. The amalgam rapidly decomposes into mercury, A., and hydrogen, thus pointing to the temporary formation of a substance  $\text{NH}_2$ , which has an action analogous to that of sodium or potassium in like circumstances. The salts of this radical are similar in general character to those of the alkalis. The following are the chief:

**Ammonium fluoride**,  $\text{NH}_4\text{F}$ , obtained by saturating hydrofluoric acid with A. It decomposes silicates and therefore is used in mineral analysis and for etching on glass.

**Ammonium chloride**,  $\text{NH}_4\text{Cl}$ , or sal ammoniac, is prepared on a large scale from the ammoniacal liquor of the gas-works. It is used medicinally in bronchitis, rheumatism, and liver disease; in dyeing and in the processes of tinning and soldering; and in the manuf. of Leclanché and dry electric batteries.

**Ammonium sulphate**,  $(\text{NH}_4)_2\text{SO}_4$ , found in volcanic dists., but prepared in large quantities synthetically and from gas liquor. It is used for the manuf. of other ammonium salts, but chiefly as a nitrogenous manure.

**Ammonium nitrate**,  $\text{NH}_4\text{NO}_3$ , prepared by neutralising A. with nitric acid. It explodes when rapidly heated and is used as a constituent of various explosives (e.g. ammonal, a mixture of A. nitrate with powdered aluminium), and for the manuf. of nitrous oxide. It was formerly used in small-scale manuf. of ice-cream, since a low temp. is produced when it is dissolved in water.

**Ammonium carbonate** is known as rock-A. and is used in smelling-salts and for cleansing purposes. The commercial product is mainly a mixture of ammonium bicarbonate,  $\text{NH}_4\text{HCO}_3$ , and ammonium carbamate,  $\text{NH}_2\text{COONH}_4$ .

**Ammoniac**, Gum, a gum-resin used medicinally as an expectorant or plaster. It is obtained from the umbelliferous plant *Dorema ammoniacum* in the form of a milky juice. Its smell is nauseous.

**Ammonite** (from ammonia), a nitrogen compound used for blasting.

**Ammonites**, a Semitic race descended, according to Gen. xix. 38, from Lot, their progenitor being Ben - ammi; they were closely related to the Moabites. Their chief city was Rabbah, or Rabbath Ammon; their national deity was Moloch or Milcon; their language was akin to the Heb. Frequently at war with the Jews, they were defeated by Jephthah, Saul, and David, and finally by Judas Maccabeus. Their last historical notice was by Justin Martyr, who affirmed that in his day they were still very numerous.

**Ammonius Saccas** (third century A.D.), a Gk. philosopher of Alexandria, who devoted himself to the reconciliation of the teachings of Plato and Aristotle. Through his followers he founded the Neo-Platonic philosophy. His surname was given him on account of his humble origin, he having perhaps been a porter in his youth. His chief pupils were Plotinus, the 2 Origenes, and Longinus. Sev. other important men have borne the same name. The chief are A., the Grammarian, whose writings are of doubtful authenticity, and A., son of Hermias, an Alexandrian, who taught at this tn., and wrote some commentaries on Aristotle.

**Ammonoidea**, a fossil order of cephalopodous molluscs; they are tetrabranchiate, and closely allied to the Nautiloidea, of which some species are alive, while the 500 species of A. are all extinct. The shell is usually discoid, the only straight one belonging to the baccrites. The opening is simple, the first chamber spherical or ovoid, and the last contained the animal, which was probably kept entirely within the shell. The different species are widely distributed. See P. Reyné's *Monographie des Ammonites*, 1879; A. d'Orbigny's *Paléontologie française*, 1840-52.

**Ammunition** (from Lat. *munire*, to defend, through the Fr.), a term embracing all the stores used for attack and defence, including guns, gunpowder, projectiles, and all the accessories. A. is described as *fired* when the projectile, powder, and primer are combined in a single piece generally enclosed in a metal case. In small arms, machine guns, and quick-firers it is invariably of this kind. For the larger guns, the 3 components are kept separate. The powder is generally packed in bags now made of silk, though serge was once common. The primer may be constructed to ignite by percussion, friction, or an electric current, or by a combination of the first and last (percussion electric). Projectiles are of numerous patterns, to suit the various types of guns. Plain spherical stone balls were first used, and *cage-shot*, still in use, may be traced back to the fifteenth century. They are intended for use only at close quarters, and consist of a cylindrical case of sheet iron filled with bullets. On leaving the bore the case breaks and the bullets are scattered broadcast. This shot is useful

only against the persons of the enemy, and is valueless for the destruction of defences. The case is the same with *shrapnel shell* (invented at the end of the eighteenth century). They consist simply of common shell filled with bullets, the bursting charge in the base of the shell being fired by a flash from the fuse in the head passing down a central tube. It was found that the bullets were apt to scatter too far and also that premature explosion was likely, so the bursting charge is now made only sufficiently large to open the shell during flight.

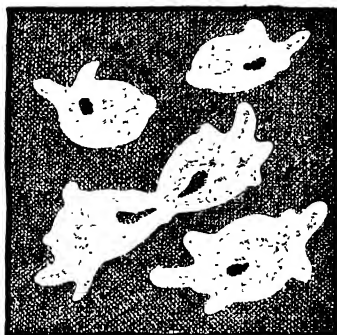
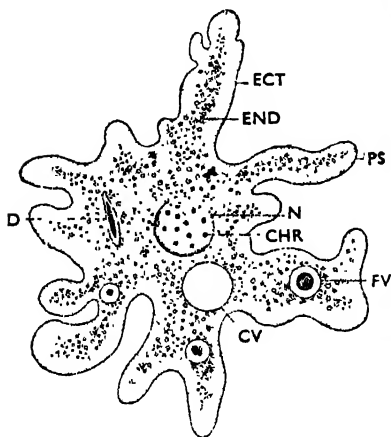
*Common shell*, to which reference has already been made, consist of a hollow cylinder of steel (or occasionally cast iron) filled with ordinary gunpowder or some high explosive such as lyddite. They are essentially a destroyer of material, and so the bursting charge is made as large as possible. High-explosive shell, generally known as 'H.E.', filled with various types of high explosive, are of modern adoption. With the introduction of armour-plating for ships, armour-piercing projectiles became necessary, as the ordinary cast-iron projectile was useless. These consisted of pointed cast-iron shot specially hardened (by a method invented by Sir W. Palliser), but are now made of forged or cast steel, cast from a special mixture. *Hand grenades*, small, spherical common shell filled with powder weighing 3 or 6 lb., though commonly regarded as obsolete, were used in the Russo-Jap. war of 1904. There are also various other extraordinary types of shell, such as the *segment* and *ring* shells, both varieties of the shrapnel. The question of the means to ensure correct rotation is important. In rifled muzzle-loading (R.M.L.) guns this was originally effected by a spiral arrangement of gun-metal studs. This was defective as it caused erosion of bore through the escape of powder-gas. Rotation is now secured by a cupped copper disk or 'gas-check' attached to the base of the projectile. The earlier Armstrong (R.B.L.) projectiles were coated with lead, which the explosion forced into the grooves. The lead coating, however, proved too soft, and the use has now become universal of a copper driving-band fitted into a groove round the body of the projectile. During the First World War many new types of A. were introduced to meet the varying methods of warfare. Among these the following are the more important: *Smoke shells*: these contained a smoky mixture which, on bursting, created dense clouds of smoke. Its tactical use was for screening movement, and for ranging guns where the observation of fall of shot was otherwise difficult. *Star shells*, containing parachute lights and made to open in the air by a small charge, were used to illuminate areas in the enemy's position. *Gas shells*: these were first introduced by the Gers. They contained poisonous gases which were released by the bursting of the shell. *Mortar bombs* were introduced for trench

warfare. They were fired from trench mortars of varying sizes and were charged with gas or high explosive. Their simplicity of design and lightness in transport made them very suitable for use in trenches. *Aerial bombs*: cylindrical and torpedo-shaped, designed for dropping from aircraft by release from carriers in the machine. The chief types used were those filled with high explosives for damaging buildings, earthworks, railways, and A. dumps, and those with incendiary mixture for setting fire to buildings, etc. *Anti-aircraft shell*: these are filled with high explosives for attacking hostile

of V1 (flying bombs) and V2, some of them piloted models, were in the experimental stage. *Anti-aircraft rockets, airborne rockets*, and many other types considerably in advance of any missiles then known were also under development in Germany. The *atomic bomb*, the principle of which depends on the fission of uranium nuclei, was introduced by the Amers. against Japan with devastating results (see ATOMIC BOMB).

*Ammurapi*, see HAMMURABI.

*Amnesia* (Gk., lack of memory), partial or complete loss of memory. Complete A. is practically impossible, as without some memory no intellectual



AMEBA, MULTIPLYING BY DIVISION

**Left: AMCEBA PROTEUS**

ECT, ectoplasm; END, endoplasm; CV, contractile vacuole; D, shell of a diatom which has been taken in as food; PS, pseudopodium; N, nucleus containing granules of chromatin, CHR.

aircraft, and are arranged to burst in the air by means of a time burning fuse. All these types were again in use, though much developed in range and power, in the Second World War (1939). Many great changes were introduced in the Second World War. Among them were the much-increased size of bombs carried by bomber aircraft, ranging from 4500 lb. to 12,000 lb., and even heavier than that (see BLOCKBUSTER). Some of the Ger. anti-aircraft shells were rocket-propelled, and controlled by radar or radio, thus resembling the Amer. proximity fuse. Another development was the *flying bomb*, which the Gers. used for attacking London in 1944-45 (see FLYING BOMB). The V2 or *rocket bomb*, another Ger. missile used against London, had a velocity of 3000 m.p.h. (see under ROCKET). In the closing stages of the war missiles of many types were being developed—controlled and guided, target-seeking and free. The Gers. had under development a transatlantic rocket that would be capable of making the crossing in a little over a quarter of an hour; while new forms

action could continue. The commonest form is that of verbal A., when the names of objects are forgotten. When the patient can partially articulate, the condition is known as A. aphasia. A. may be caused by old age, brain-diseases, various forms of insanity, or even by excessive fatigue or weakness. The condition may be permanent, but is generally temporary. A. due to hysteria or hypnotism may be called periodic.

*Amnesty* (Gk. *amnesia*, oblivion), an act of state granted by a gov. by which pardon (or oblivion) of certain past offences is accorded. It is generally given in the case of whole sections of the community, who have been guilty of some offence against the state, and it completely obliterates the offence, whether granted before or after conviction. As., granted either by the sovereign or by Act of Parliament, are sometimes general, but more often have certain exceptions made; e.g. those responsible for his father's execution were excepted from the A. granted on the

**accession** of Charles II. As. were frequently granted to criminals at coronations.

**Amnion** (Gk. *ἀμνός*, a lamb) is the innermost membrane which invests the fetus of mammals, birds, and reptiles. As time proceeds it thickens and separates from its close adhesion to the embryo; between it and its contents there then flows the *liquor amnii* which preserves the embryo from harm and keeps it at an equal temp. Its softness is responsible for its name.

**Amœba** (Gk. *ἀμοιβή*, change), a genus of Protozoa, the lowest class of animal life, and type of the order Amœboidea. It consists of naked protoplasm containing a single nucleus, and the cytoplasm is granular. It contains a *contractile vacuole*, or pulsating space, and possesses the power of throwing out *pseudopodia*, processes which are continuously being drawn back while others are protruded. It is by this succession of pseudopodia formation that the organism is capable of motion in the water. The food is absorbed into any part of the body by intussusception, and the wastes are expelled by any part of the body. There is no sexual reproduction, the A. merely splits in two when it reaches maturity. The resulting organism is transparent and colourless, or faintly yellow, and may be found in fresh water; frequently it is extremely minute. (See illustration, p. 299.)

Species of an allied genus, *Entamoeba*, differing from A. in the absence of a contractile vacuole, occur in the human intestine; one of them, *E. coli*, is harmless, but another, *E. histolytica*, attacks the mucous membrane, causing amœbic dysentery, a disease which is rife in tropical and sub-tropical countries. See J. Leidy's *Fresh-water Rhizopods of N. America*, 1879; E. Haeckel's *The Radiolaria*, 1862.

**Amœbean Verses** (Gk. *ἀμοιβαῖος*, interchanging), a species of verse in which 2 persons answer alternately. Such are some of Virgil's *Elogues*.

**Amol**, Persian city, prov. of Mazandaran, on R. Heraz. Pop. 10,000.

**Amontillado**, a popular variety of light Sp. sherry.

**Amontons, Guillaume** (1663-1705), a diligent mechanician and experimenter in natural philosophy, was b. in Paris. He improved the instruments and devised others for measuring the density, temp., and humidity of the atmosphere; he was the first to make experiments in a species of telograph.

**Amoor**, see AMUR.

**Amorites** ('mountaineers,' or possibly 'people of high stature') an ancient race of Canaan, occupying the land on both sides of the Jordan. The name is sometimes used in the O.T. as synonymous with Canaanites, sometimes as that of a special tribe. Sihon and Og, the kings of the A. on the E. of Jordan, were defeated by Moses, and later those dwelling on the W. were defeated by Joshua in 2 battles, and their land was divided among the tribes.

**Amoroso** (It., loving or tender), in music, indicates a tender, slow manner.

**Amorphophallus** is a genus of Araceæ found in the E. Indies. The rhizome produces a single enormous leaf annually, and an enormous spadix, bearing both male and female flowers. In the species *A. Titanum* the spadix is sometimes 3 ft. high.

**Amorphous** (Gk. *ἀ-*, without, *μορφή*, shape), a term used in biology to denote that a body is formless or irregular in shape. In chem. amorphism is the state of a substance in which it presents no crystallised form.

**Amortisation**: 1. A law term, signifying alienation in mortmain, that is, the alienation of lands or tenements to a corporation, which was considered formerly as transferring them to *dead hands*, as such alienations were usually made to religious houses for superstitious uses. 2. In finance, the provision of a fund out of income for extinction of debt, redemption of bonds or shares, or replacement of cap. expenditure.

**Amory, Thomas** (c. 1691-1788), an Irish author of eccentric habits who in 1757 was living at Westminster. His books are a medley of autobiography, fiction, scenic descriptions, sentimental rhapsodies, and deist theology. His pub. *Memoirs, containing the Lives of several Ladies of Great Britain; a History of Antiquities, etc.*, 1755; and *Life of John Bunce, Esq.* (his best book), 1756 and 1766.

**Amos**, the earliest of the 12 minor prophets. He was a native of Tekoa, near Bethlehem, and followed the occupations of a shepherd and a tender of sycamore figs. He prophesied in the eighth century B.C. when Uzziah reigned in Judah and Jeroboam II. in Israel. He prophesied the death of Jeroboam and the captivity of Israel on account of the national sins, chief of which is disloyalty to Yahweh, the nation practising in his name rites abhorrent to him. The style of the prophet is clear and vigorous, abounding in picturesque images drawn from pastoral and country life. He was probably not alone in warning the people that the expected 'day of Yahweh' was not to be attended with joy, but he is the first whose prophecies were written as well as spoken. The book of A. contains many difficulties, some of which are textual. Additions have certainly been made to the original work, the most obvious being the concluding passage, plainly of post-exilic authorship. See S. R. Driver, *The Books of Joel and Amos* (Cambridge Bible for Schools), 1877.

**Amoy** (corruption of *Hai-mun*), a Chinese port on is. of same name in lat. 24° 28' N., and long. 118° 8' E., in the prov. of Fukien. It is on the S. of the is., and, though large and possessing some fine buildings, is exceedingly dirty. It was once the chief centre for the export of China tea, but this trade has dwindled away. Prior to the Sino-Jap. war (1931) (q.v.) a great many Chinese



emigrants were accustomed to sail from A. to Malaya, and, after making their fortunes there, return and live there. The self-governing foreign settlement is on a rocky little is. opposite. A Chinese univ. was founded in 1925. The city also exports porcelain and paper, importing raw cotton, cotton manufactured goods, etc. A. was one of the 5 ports opened to Brit. commerce by the treaty of Nanking in 1842, having been taken by the Brit. in 1841. It was captured by the Jap. on May 19, 1938, but surrendered in 1945. Pop. 150,000.

**Ampelopsis** is a genus of Vitaceæ (or Ampelidaceæ), now included in *Vitis* (q.v.), the vine genus. *A. Veitchii* (or *V. inconstans*), which climbs by means of sucker-like disks at the tips of the tendrils, and *A.* (or *V.*) *hederacea* (or *quinquefolia*), are the common Virginian creepers.

**Ampere**, in electricity, the unit of intensity of current. In terms of other units it may be defined as the intensity of that current which is produced in a conductor whose total resistance is 1 ohm when there is kept up between its extremities a potential difference which constantly amounts to 1 volt. The A. is legally defined as the continuous unidirectional current which, when flowing through a neutral solution of silver nitrate, deposits on the negative pole 0.001118 of a gramme of silver in 1 sec. An alternating current is said to have an intensity of 1 A. if it produces in a fine wire the same heat in the same time as a continuous current of 1 A. as determined by silver deposition.

**Ampère, André Marie** (1775-1836), famous Fr. physicist, naturalist, and mathematician, from whom the ampere, unit of strength of an electrical current, took its name. He was b. near Lyons. In 1793 his father was guillotined by the revolutionists. This event threw him into a state of deep melancholy, to alleviate which he redoubled his studies. As prof. of mathematics and physics at Bourg, he pub. his *Considérations sur la théorie mathématique du feu*. His great work was in the field of electrodynamics (electro-magnetism). His records of his discoveries may be found in the *Ann. Chim. Phys.* from 1820 onwards.

**Ampère, Jean Jacques** (1800-1864), b. at Lyons, was the only son of André Marie A. and prof. of the hist. of Fr. literature at the Collège de France. He was a distinguished philologist, cognisant with the languages of most of the many countries he visited. In 1839 and 1841 he pub. hist. of various periods of Fr. literature. In 1848 his *Grèce, Rome et Dante* gave an impetus to the study of the great It. in France. His chief work, on which he was engaged at his death, is his *Histoire romaine à Rome*.

**Ampersand** (corruption of 'and per se and'), the typographical character & or &.

**Amphiaræus**, in Gk. legend, a famous soothsayer and hero of Argos, the son of Oicles and Hypermnestra, and a member of the Argonautic expedition. His

wife, Eriphyle, bribed by Polyntices with the necklace of Harmonia, induced him to take part in the first expedition of Seven against Thebes, where, after fighting bravely, he took to flight and was swallowed up by the ground. He was made one of the immortals, and the temple built in his memory long harboured a famous oracle.

**Amphibia** (Gk. ἀμφί, on both sides, βίος, life), a class of vertebrates of which many are able to live on land for a considerable period—hence the name. The living species include salamanders, frogs, toads, and newts. The class is divided into 4 orders, the *Gymnophiona*, which are sightless, limbless, and snakelike; the *Urodela*, which possess tails and usually 4 limbs, and are scaleless, e.g. salamanders and newts; the *Anura* (or *Batrachia*), which are tailless and scaleless, but have external gills and 4 limbs, e.g. frogs and toads; the *Stegocephali*, an extinct order, lizard-like and bony, usually with long tails.

All A. have gills, though these are often replaced by lungs in the adult; their hearts possess 2 auricles, 1 ventricle, and a conus arteriosus; when they have limbs the legs are pentadactyle; the skin is soft and scaleless except in the *Gymnophiona*. The eggs are usually laid in water; in the case of the axolotl (see AMBLYSTOMA) breeding takes place in the larval stage. The eggs often develop into tadpoles, but some A. are viviparous and bring to life perfect animals. They are carnivorous when adult, and hibernate. In organic life they rank between reptiles and fishes. Many live in tropical countries, but frogs and toads are universally distributed. See H. Gadow's *Amphibia and Reptiles in the Cambridge Natural History*, 1901; G. A. Boulenger's *Catalogue of the Batrachia in the British Museum*, 1882.

**Amphibole** (Gk. ἀμφίβολος, ambiguous), a group of minerals which enter into the composition of a large number of rocks. They are essentially silicates of calcium and magnesium, but also include oxides of iron and of manganese. They crystallise in oblique prisms, and some are used as gems. The chief varieties are tremolite, actinolite, and hornblende.

**Amphibrach** (Gk., short on both sides), in prosody a foot of 3 syllables, the first and last short, the middle long, as in Lat. *āliam* and Eng. *inhūmān*.

**Amphictyonic Council**. An amphictyony was a confederation of neighbouring tribes, or those having interests in common, for purposes of mutual protection and the guarding of some shrine. The participants in such a league were called amphictyons, or dwellers around. There were sev. A. Cs. in ant. Greece, as those of Argos and Delos, but the chief was that of Delphi. Its origin was certainly very early, being connected traditionally with Amphictyon, son of Deucalion, and, though much of its authority was lost in the third century B.C., it still existed with

limited power under Rom. rule, and is last mentioned in the second century A.D. The names of the tribes concerned differ in various accounts. The list given by Æschines includes the Thessalians, Boeotians, Dorians, Ionians, Perthebians, Magnes, Locrians, Ceteans, Phthiot, Malians, and Phocians. It is known that there were 12 tribes, so to this list either the Dolopians or the Ænians should be added. Each tribe sent 2 deputies of equal authority, who met twice each year, alternately at Delphi and Thermopylae. Though the functions of the council were mainly religious, concerned with the sanctuary of Pythian Apollo, judicial rights and the regulation of peace and war came within its scope. See J. B. Bury, *A History of Greece to the Death of Alexander*, 1900.

**Amphidesma** (Gk. ἀμφί, on both sides, *desmos*, bond), or *Semele*, a genus of molluscs of the order Teleodermacea and family Semelidae. Lamarck gave it the above name because he observed that it had a ligament and a cartilage. There are about 100 species to be found in the Tertiary and Recent systems.

**Amphilochus**, in Gk. mythology, son of Amphiaraus (q.v.) and Eriphyle (q.v.). He took part in the expedition of the Epigoni (q.v.) against Thebes, assisted Alcmaeon in the murder of their mother and, later, fought against Troy. Like his father, he was a noted seer. Killed in single combat by Mopsus, also a seer.

**Amphimacer** (Gk., long on both sides), in prosody, a foot of 3 syllables, the first and last long, the middle short, as in Lat. *cōstās*. A. is the opposite of *amphibrach*.

**Amphion**, in Gk. mythology, a skillful musician. Son of Zeus by Antiope, who, driven out of Sicyon by her husband, Lycus of Thebes, and Dirce his wife, fled to Mt. Cithæron, where A. and his twin brother Zethus were born. They were exposed there, but found and reared by a shepherd. On reaching manhood they revenged their mother's wrongs on Dirce by causing her to be dragged to death by a bull. They then took possession of Thebes, and during the building of its fortifications the stones moved to the sound of A.'s lyre. He married Niobe, and was killed by Apollo.



AMPHIOXUS LANCEOLATUS

The notochord runs from tip to tip. T, tentacular cirri; G, reproductive organs, AP, atropore; A, position of anus.

**Amphioxus** (Gk. ἀμφί, on both sides, *oxus*, pointed), a small fish-like animal, is found in all seas. Its organs are all primitive when not absent; visual and olfactory organs are not definitely known to exist, the notochord is never replaced

by a vertebral column, and there are no limbs. It contains, however, a mouth and an anus and many gill-slits. It reaches a length of nearly 2 in., is generally found burrowed in sand, but can swim freely. About 10 species are known, and *A. lanceolatus*, the lancelet, is common to European seas. The particular point of interest of this animal is that it represents a prototype of the Vertebrates, although of course it must not be regarded as their direct ancestor; indeed it has been said 'that if A. had not been discovered it would have been invented.' See A. Willey's *Amphioxus and the Ancestry of the Vertebrates*, 1881.

**Amphipoda** (Gk. ἀμφί, on both sides, *pous*, foot), an order of Crustacea characterised by their laterally compressed bodies, sessile eyes, 3 pairs of swimming and 3 of jumping feet. They are both marine and fresh-water animals. Species of the sub-family Orchestina are known as the beach-flea and sand-hopper.

**Amphipolis**, anct. city of Macedonia, on lt. Strymon, 3 m. from Ægean Sea. Originally a Thracian tn., inhabited by Edonians, it was taken by Athens about 436 B.C. In 424 B.C. it passed to Sparta, later to Macedon, and finally to Rome.

**Amphisbænidae** (Gk. ἀμφίβαινα, a serpent that can go both forwards and backwards), a family of the Lacertilia, or lizards. These reptiles have no limbs, except in a solitary genus, and resemble snakes or worms in appearance. They are found in tropical America and Africa, where they feed on worms and ants. *Amphisbana fuliginosa*, of Brazil and Guayana, is dusky brown and nearly 2 ft. long. The natives regard its dried and powdered body as of medical value.

**Amphissa** (modern Salona), a tn. of anct. Greece, about 80 m. N.W. of Athens, situated at the foot of Mt. Parnassus. Its inhab., the Locri Ozolæ, having tilld the ground of the temple of Delphi, the Gks. under Philip of Macedon attacked and destroyed the tn. Pop. of modern Salona, 9000.

**Amphitheatre**, a form of building invented by the Romans for the purpose of holding gladiatorial shows and displays of wild beasts. Originally these entertainments were held in the forum or the circus, but as early as 70 B.C. a wooden A. of the recognised shape, i.e. having seats all round the portion reserved for the performance, existed at Pompeii. The first A. to be erected in Rome was the temporary one of Curio in 59 B.C., and Cæsar erected a permanent structure in 46 B.C. Augustus, in 30 B.C., ordered Statilius Taurus to build the first A. made partly of stone, and the Colosseum, the most famous building of the kind still remaining, was erected by Vespasian and dedicated by Titus in A.D. 80. It is elliptical in shape, measuring 616 ft. by 510 ft., and the exterior wall, 168 ft. high, consists of 4 stories, the lowest 3 being arcades in the Doric, Ionic, and Corinthian styles respectively, and the top a row of Corinthian pilasters. Inside,

the *cavea* or portion for spectators, consists of the *podium*, or lowest tier, reserved for guests of honour, and 3 rows of *maeniana*, for the various grades of the populace. The arena measures 280 ft. by 176 ft. The ruins of the A. at Arles show that it was capable of containing 20,000 spectators. It was later turned into a fortress, flanked by 4 great towers, of which 2 remain.

**Amphitrite**, Gk. sea-goddess, daughter of Nereus and Doris, and wife of Poseidon.

**Amphitryon**, son of Alcæus, king of Tiryns, married Alcmena, who, during his absence, was visited by Zeus in the shape of her husband.

**Amphiuma** (Gk. ἀμφί, on both sides, πνεύμα, breath), a genus of Amer. Amphibia of the order Urodela and family Amphiumidae. It is allied in most essentials to the water-newt, is eel-like, about 2 ft. long, has 2 or 3 jointless toes on each of its 4 limbs, minute eyes, and numerous teeth in the palate in 2 rows. As a tadpole it has gills; in adult life only the gill-slits remain. It lives in ponds and marshes, and buries itself in mud in the winter. *A. tridactylum*, the 3-toed species, inhabits Louisiana; *A. means* is called the Congo snake by the inhab. of Florida, and is erroneously believed to be venomous.

**Amphora**, a clay vessel used in Greece and Rome for wine and oil, and also as a cinerary urn; usually tall and slender, with a narrow neck and 2 handles, and often ending below in a point for insertion in the ground or a stand. The Gk. A. held about 9 gallons; the Rom. 6.

**Amplepuis**, a tn., Rhône dept., France, 19 m. by rail W. of Villefranche and 30 m. N.W. of Lyons. Manufs. of cotton, silk, and muslin. Pop. 5500.

**Amplifier**, an electrical appliance for increasing the intensity of the electrical currents passing in a communication or sound-reproducing channel. It consists of thermionic valves so connected that each amplifies the output of the previous valve, or arranged in any other combination according to the particular purpose in view. The thermionic valve for wireless reception consists of a filament, surrounded by a wire grid, above which is placed an anode for receiving a positive charge from a high tension battery. A recording A. is one which supplies the electrical transmission power to sound recorders, i.e., the wax-cutter for disk recording and the galvanometer for photographic recording. A television A. is one used for the amplification of television signals, characterised by the provision of efficient amplification of currents of a very wide band of frequency. Besides stability in operation, an A. should introduce no extraneous frequencies such as might result in disturbing noise in the sound-reproducing channel; and generally an A. may not introduce more than a specified degree of amplitude distortion into the system during its normal operation. See also LOUD-SPEAKER.

**Amplitude**, an astronomical term denoting the angular distance of a heavenly body, at the time of its rising or setting, from the E. or W. point of the horizon. Thus the A. of fixed stars is constant, while that of the sun is zero at the equinoxes.

**Amptill**, a mkt. tn. of Bedfordshire, 8 m. S.W. of Bedford. Near it are the ruins of Houghton House, supposed to be the original of the 'House Beautiful' in Bunyan's *Pilgrim's Progress*. A. House is the seat of the A. family. Pop. 2000.

**Amptill**, Odo William Leopold Russell, first Baron (1829-84), was b. at Florence and educated privately. He entered the diplomatic service in 1849 and served as attaché at Vienna. From 1850 to 1852 he was in the Foreign Office. Subsequently he was employed in turn at the embassies in Paris, Vienna, Constantinople, and Washington. As secretary of legation at Florence and Brit. representative at the Vatican he performed valuable diplomatic services from 1858 to 1870. In 1870 he was appointed assistant under-secretary at the Foreign Office, and in 1871 he became ambas. at Berlin, where he attended the Berlin Congress as third plenipotentiary and rendered valuable services. He d. at Potsdam. He was made a privy councillor in 1872 and created a baron in 1881.

**Amptill**, Arthur Oliver Villiers Russell (1869-1935), second Baron, son of the first baron, was b. in Rome, and educated at Eton and Oxford, where he was president of the union. He succeeded to the title in 1883, and was assistant private secretary 1895-97, and from 1897 private secretary to Joseph Chamberlain. He was governor of Madras 1899-1906, and during 1901 temporary viceroy and governor-general of India in Lord Curzon's absence.

**Ampulla** (Lat. *ampulla*, bottle), a Rom. bottle with a narrow neck; in Rom. Catholic Church, a cruet for the sacramental wine; also a vessel for holding the holy oil at the rites, coronations, etc.

**Ampurias**, a tn. in the dist. of Gerona, Catalonia, Spain, situated near the gulf of Rosas. It was founded by the Gks. of Marseilles and called by them Emporium. The Roms. called it Emporiae, and in their time it was a flourishing city. In the time of the Goths it was an episcopal see. Pop. 2800.

**Amputation**, the cutting off of a limb or projecting part of the body, sometimes necessary in order to prevent the mortification or disease of that part poisoning or exhausting the whole body. There are 3 inventions which have made A. safer and more readily resorted to than in previous centuries. These are the tourniquet, to stop the flow of blood in the arteries; anaesthetics, to procure painlessness; and antiseptics, to prevent infection of the wound. The objects of A. are primarily to remove a dangerously diseased or injured part, and then to leave a stump which may be as useful and as free from pain as possible

to the patient. To this end the methods of A. design to leave a pad or cushion of flesh at the end of the severed bone. In the 'circular' method this is attained by an assistant pulling the skin and flesh upwards as far as possible, while circular sweeps are made with the knife in a direction perpendicular to the long axis of the limb. This results in the soft parts being somewhat longer than the bone, so that they may be used as a covering. In the 'flap' method, the tissues are transected by the knife near the bone, and a cut is made downwards and outwards to the surface of the skin. The operation is repeated on the other side of the bone, the blood-vessels are secured, and the bone is sawn through. This leaves 2 semicircular flaps which are afterwards sown together.

**'Amr, Mosque of**, the earliest Arab building of Cairo. It dates from A.D. 613.

**Amraoti**, cap. city of dist. of same name in E. Berar, Hyderabad, India, 28 m. S.E. of Ellichpur. An important cotton-mart, with large textile manufs.; the headquarters of the commissioner of the prov.; and terminus of a state branch railway. Pop. 46,400.

**Amravati**, ruined city in Guntur dist. of Madras, India, on R. Kistna. Formerly one of the chief centres of the Buddhist kingdom of Vengi and later of the Sivaite faith. Identified with the To-no-kie-tse-hia of Hsuan Tsang, and the Arab Rahml.

**Amrilcais**, or **Amru-ul Qais**, Arabian poet of the sixth century, was the son of the chief of the Kinda tribe, and lived a wandering life among the Arab vagabonds and brigands until the death of his father, who was killed by the Bonu-Asud tribe. He is then supposed to have bent his efforts on securing vengeance, and to have obtained troops from the Emperor Justinian. According to tradition, he was shortly afterwards killed by a poisoned cloak presented to him by the emperor, who had been told by some informer that A. had been guilty of seduction. He is the author of one of the 7 *Muallaka*, in which he displays great imaginative powers. He is regarded as one of the founders of Arabian poetry. His poems have been pub. in Ahlwardt's *The Divans of the Six Ancient Arabic Poets*, 1870.

**Amritsar**, cap. city of dist. (1571 sq. m.) and div. (5354 sq. m.) in Punjab, India, 33 m. E. of Lahore. An important commercial and manufacturing centre, with large textile industries. It is the religious centre of the Sikhs, who have there a large temple (built in 1551 by Ram Das on an island in a tank) attended by 6000 priests. The Govindgarh, a large fortress enclosed by a deep ditch 2 m. in length, was erected in 1809 by Ranjit Singh. Semi-revolutionary disturbances broke out in the Punjab and in other provs. in 1919. A., where Brig.-Gen. Dyer was in command of troops, was the scene of the gravest of these disturbances. A crowd of 15,000 natives had assembled in de-

fiance of public proclamation in a space known as Jallianwala Bagh (Apr. 13). They were unarmed, but Gen. Dyer, who considered the situation critical, ordered his troops to fire. Some 400 of the rioters were killed and many wounded. The Brit. Gov. appointed a committee under Lord Hunter to investigate the affair. This committee condemned Dyer's action as being unduly severe, and the House of Commons adopted their report. Sir Michael O'Dwyer, who was governor of the Punjab at the time, was assassinated at the Caxton Hall, Westminster, by an Indian on Mar. 13, 1940. On the partition of India in 1947 into 2 autonomous dominions the holy city of A. was assigned to the dominion of India, there being then, on balance, more Hindus and Sikhs in the pop. than Muslims. Pop. (1941) 390,000.

**Amru-Ibn-Al-Aas** (d. A.D. 663), a famous Arabian warrior, who after bitter opposition to Mohammed ultimately became one of the prophet's chosen supporters. From Mohammed's successor, Abu-Bekr, he obtained a command in the army in Syria. He fought at the battle of Alzadain and distinguished himself in the sieges of Damascus and Jerusalem. In the years 638-40 he conquered Egypt, the campaign terminating in the capture of Alexandria, when he is said to have been responsible for the destruction of the Alexandrian library. This charge, however, has never been proved. In his subsequent administration of Egypt he exhibited great ability, interesting himself in various public works, amongst which is said to have been the construction of a canal joining the Red Sea and the Mediterranean.

**Amrum**, or **Amrom**, one of the N. Frisian Is. in the North Sea. Its length is about 6 m. and its pop. 700.

**Amru-ul Qais**, see **AMRILCAIS**.

**Amsler**, Samuel (1791-1849), Ger. engraver, b. at Schiznach, Switzerland, studied at Zurich, Munich, and Rome. Became prof. of line-engraving at Munich, 1829. Best works, 'Triumphal March of Alexander the Great' (Thorwaldsen), 'Triumph of Religion in the Arts' (Overbeck), and reproductions of Raphael.

**Amsteg**, a Swiss tourist resort in the canton of Uri, 7½ m. S.E. of Altdorf, on the St. Gotthard railway.

**Amstelodamum**, Lat. name for Amsterdam.

**Amsterdam**: 1. (The dam of the Amstel.) The chief commercial and industrial city of Holland, is situated at the mouth of the Amstel R., in the S.W. corner of the IJssel Meer, formerly Zuider Zee. It is connected with the North Sea by the N. Sea Canal, 15 m. long, to the construction of which (1876) it owes much of its present prosperity. Breadth 75 metres, depth 12.5 metres, within short 100 metres and 15 metres respectively. Accessible for the largest vessels by day and night, not depending on tide. Biggest lock in the world, 400 metres long, 50 metres broad, 15 metres deep. Though

the importance of its shipping is secondary to that of Rotterdam, it is the headquarters of the shipowning interest and of the trade with the Dutch E. Indies; its prin. imports are coal, ore, grain, petroleum, tobacco, tea, coffee, cocoa, sugar, timber, and oil seeds, while it has considerable exports of dairy produce, paper, cokes, artificial manure, sugar, and hides.

Among the chief industries are to be mentioned diamond cutting and polishing, for which the city has long been famous, sugar-refining, manufacturing of ready-made clothes, letter-casting, printing offices, iron, soap, dye, chemical manufs., shipbuilding, brewing, distilling. A. is connected with the hinterland by the A.-Rhine Canal, and is remarkable for the number of its well-equipped docks and quays, and for its canals, by which it is intersected in all directions. In this last respect it has been likened to Venice. There are many notable buildings and institutions, among which must be mentioned the royal palace, completed in 1663, built as a tv. hall; the New Church (Nieuwe Kerk), a splendid Gothic building dating from 1408 and notable for its stained-glass windows and monuments; the Old Church (Oude Kerk), dating from the beginning of the fourteenth century; the St. Antonieswaag, originally a tv. gate and now the site of the A. Historical Museum; the Treppenhuis (1662), and of modern date the Exchange (Koopmansbeurs) and the Netherlands Trading Company office building. The Ryksmuseum (state museum) contains the wonderfully fine national collection of pictures. There are also botanical and zoological gardens, the latter being one of the finest collections in Europe. A. has 2 univs., the Municipal Univ. and the Free Univ., and many other educational and charitable institutions. The Portuguese Synagogue, built in 1670, has a magnificent interior. Houses are built on wooden piles, and the royal palace stands on 13,659. The inhab. of this prosperous city are ceaselessly industrious. It is a city of merchants, bankers, traders, and shopkeepers; it is in the forefront of modern sea- and airports, the market for the produce of the Dutch Indies—tobacco, coffee, tea, sugar, rice, spices—and world market for tobacco and quinquina. The goods traffic of the port increased 100 per cent between 1913 and 1938.

The hist. of the city dates from the beginning of the thirteenth century, when Giesbrecht II. of Amstel built a castle there. At this time it was nothing more than a fishing vil. It received its first charter from Guy of Hainault, bishop of Utrecht, in 1300. In the sixteenth century the city's prosperity greatly increased on the decline of that of Antwerp. In 1648, with the closing of the Scheldt by the treaty of Westphalia, A. secured even greater advantages at the expense of the Belgian city, though a due share of its commercial advance in the seventeenth century must be assigned to the foundation of the Dutch E. India Company in 1602 and the Bank of A. in 1609. The

Prussians occupied the city in 1787, and it was taken by the Fr. in 1795. Chosen by Louis Bonaparte in 1808 as the cap. of the Netherlands, it was officially recognised in 1810 as the third city of the Fr. empire. During the brief resistance of the Dutch forces to the Ger. invasion of Holland in May 1940, many air raids were carried out at Schiphol (A. airport).

Ger. destruction of the harbour installations began early in Sept. 1945, when the Allies reached the S. border of Holland. After a few days, with the halting of the advance, the work of destruction was stopped; it was not resumed. Though falling short of what was originally planned, Ger. destruction was great. In spite of so much destruction, the port of A. was far from being a total loss. The greater part of the harbour, especially on the E. side, was almost untouched, except where cranes had blown up. The links with the hinterland—to the E. across the IJssel Meer (Zuider Zee) and to the S. as far as the Rhine—were intact at the end of the war. The restoration of the port began immediately after the liberation of A. and by the close of 1945 much of the damage had been made good and the quays had been cleared. Pop. declined from 803,073 (1940) to 772,941 (1945), mainly in consequence of the deportation of the Jews. See Kroon's *Amsterdam*, 1888; J. ter Gouw's *Geschiedenis van Amsterdam*, 3 vols., 1879-81; H. Brugman, *Geschiedenis van Amsterdam*, 8 vols., 1930. 2. A city in Montgomery co., New York State, 33 m. N.W. of Albany, on the Mohawk R. It has manufs. of carpets, hosiery, etc. Pop. 33,000.

**Amsterdam, New:** 1. Name of New York under the Dutch. 2. Tn. of Brit. Guiana, near mouth of Berbice, 62 m. S.E. of Georgetown. Pop. 9000.

**Amsterdam Island,** volcanic is. in Pacific, midway between Cape of Good Hope and Tasmania. Annexed by France, 1893. Area 976 sq. m. Pop. 197,000. Chief tn. St. Denis, pop. 27,000.

**Amu Darya, sec OXUS.**



AN AMULET

**Amulet,** a charm, worn or placed in a building as a protection against evil spirits. The use of As. comes from the E., where it has existed from very early times. In anc. Babylonians and Egyptians had a strong belief in the protective power of charms, and the custom was to a certain extent handed on to the Gks. and Romans. The phylacteries of the Hebs. were undoubtedly

regarded as a form of A. The early Christian fathers strongly deprecated the use of such charms, and endeavoured to replace them by relics of saints and biblical quotations. The frequent occurrence of the fish symbol in early Christian inscriptions, etc., points to a superstitious belief of this kind. As have been made of many substances, the most common being precious stones, metals, either in the natural state or made into articles of jewellery or images, and inscribed parchments, often enclosed in sachets or gold balls. Plants and parts of animals, especially the teeth, were also used. As are still in vogue in the E. and in S. Europe, where their aid is particularly invoked against the 'evil eye.' Buddhists and the Muslims both use As. with a religious significance.

**Amundsen, Captain Roald** (1872-1928), Norwegian explorer and navigator, took to the sea after graduating at Oslo Univ. and studying medicine. He served for some time as an able seaman in various whaling and sealing vessels, at the same time studying navigation and equipping himself in other ways for more responsible positions. He was subsequently appointed by Capt. De Gerlache to be first mate of the *Belgica* on the occasion of his Antarctic expedition. This expedition did not get very far, but about 4 years later, A. with a few companions started on the ambitious enterprise of navigating the N.W. passage, which he succeeded in doing in 1906, being the first man to accomplish the feat. In 1909 he visited London and announced to the Royal Geographical Society his preparations for an important expedition to the Arctic. In 1910 he set out in the *Fram*, presumably for the N., but the success of Peary in reaching the N. Pole induced him to abandon his project, temporarily at least, and in 1911 it was found that he was going to try to forestall Scott in the dash for the S. Pole. In this attempt he was successful, reaching the Pole on Dec. 14, 1911, after a comparatively easy journey. In the First World War he served with the Norwegian Naval Air Service, and from that time would appear to have favoured aerial navigation for exploration. It was not until 1914 that he took any further part in exploration, in which year he bought the *Maud* with the idea of drifting across the Pole. He navigated the N.E. passage, but early in 1919 his engine broke down and he was compelled to land in Alaska. Two years later he tried to reach the Pole in an aeroplane from the *Maud*, but without success. In 1925, having become bankrupt, he went to the U.S.A., where the Amer. explorer Lincoln Ellsworth offered to finance him in a joint flight from Spitzbergen. The 2 explorers, however, had only traversed some 500 m. when they were compelled to abandon the enterprise. A. then made arrangements to join Nobile in his dirigible, and in May 1926 he and Nobile, together with Ellis-

worth and Lt. Riser-Larsen, started from Spitzbergen and in 3 days landed in Alaska. A.'s days of exploration finished with this feat, but in 1928, hearing of the plight of his old companion, Nobile, he set out in a seaplane to attempt his rescue. In this A. and his pilot lost their lives. See ARCTIC AND ANTARCTIC EXPLORATION.

The story of his 2 chief achievements is told in his *The North-west Passage*, 1908, and *The South Pole*, 1912. He also wrote *The North-east Passage* (1918-20); *The Flight across the Polar Sea* (1926); and *My Life as an Explorer* (1927).

**Amur**, a riv. of E. Asia, formed by the confluence of the Shilka and the Argun, westward of the Khingan Mts. It has a total length of about 1700 m., not counting the head-waters, the first 800 m. being in a S.-easterly direction and dividing the A. region from Manchuria, after which it flows N.E. through the Khingan Mts. into the sea of Okhotsk at Nicolaievsk. It is navigable for its entire course. Its chief tribs. are the Sungari, the Ussuri, the Zoya, and the Bureya. The most important tns. situated on it are Blagoveshchensk, Alguu, Khabarovsk, and Marinsk.

**Amurath**: 1. A. I., sultan of Turkey 1360-89; began Turkish conquests in Europe. 2. A. II., sultan 1422-51; defeated Hungarians at Varna and Kossovo. 3. A. III., sultan 1574-95. 4. A. IV., sultan 1623-40; notorious for his extreme cruelty. 5. A. V., sultan May-Aug. 1876.

**Amwythig**, see SHREWSBURY.

**Amyclæ**, an anct. tn. of Laconia, Greece, on R. Eurotas, 2½ m. S.E. of Sparta. It was the chief tn. of the Achæans, and remained independent after the Dorian conquest. The festival of the Hyacinthia was celebrated here annually. Numerous remains have been found on the site.

**Amygdalin** ( $C_{20}H_{27}O_{11}N$ ), a glucoside found in bitter almonds, cherry kernels, and other vegetable products. When macerated and kept in contact with water, fermentation sets in, due to the presence of emulsin, and the substance is decomposed into hydrocyanic acid (prussic acid), benzaldehyde, and glucose.

**Amygdaloid** (Gk. ἀμυγδαλον, almond, *idos*, shape), the old name of a variety of igneous rock, usually basaltic, containing cavities in which round or almond-shaped bodies are formed, consisting of acate, calcareous spar, or zeolites.

**Amygdalus** is the name of a subgenus of *Prunus*, formerly considered as a genus, of the order Rosaceæ. It includes *A. communis*, the almond (*q.v.*), and *A. or P. Persica*, the peach. The leaves yield prussic acid.

**Amyl**, an organic radical corresponding to the formula  $C_5H_{11}$ . There are 8 A. alcohols, the most important being isobutyl carbinol, which is a constituent of fuel oil. A. nitrite is a yellow liquid with a penetrating odour; it is used in medicine for angina pectoris, etc.,

owing to its power of producing vascular dilation and of stimulating the heart's action.

**Amyloid Disease**, also known as Lardaceous Disease, or Waxy Degeneration, is a disease in which there is a degeneration of the cells of certain organs by which an A., or lardaceous, substance is formed. It is a secondary disease, produced by such causes as a suppurated bone, cancer, syphilis, and pulmonary diseases, and attacks most frequently the liver, kidneys, spleen, intestines, and lymphatics. It is nearly always fatal.

**Amylopsin**, a diastatic ferment from the pancreatic juice, capable of converting starch into sugar.

**Amylum**, see STARCH.

**Amyntas**: 1. A., king of Macedonia (c. 540-500 B.C.). 2. A., king of Macedonia (393-369 B.C.), was the son of Philip, the brother of Perdicas II. He sought the friendship of Athens, and left by his wife Eurydice 3 sons, Alexander, Perdicas, and the famous Philip, called by Ovid Amyntades.

**Amyot, Jacques** (1513-93), Fr. writer and translator, b. at Melun. In 1510 he became prof. of Gk. and Lat. at Bourges, in 1558 tutor to the sons of Henry II.; in 1560 grand almoner of France; and in 1570 bishop of Auxerre, where he d. His most famous translation was that of Plutarch's *Lives*, 1559, which besides being used by Cornille and establishing itself as a model of Fr. prose style, formed the basis of North's translation in Eng., 1575, from which Shakespeare took his Rom. plots. Other works were translations of *Theagenes and Chariclea*, 1546; 7 books of Diodorus Siculus, 1554; *Daphnis and Chloe*, 1559; and Plutarch's *Moral Treatises*, 1572, all of which have become Fr. classics.

**Amyris**, a genus of tropical plants of the order Rutaceæ. They yield a fragrant resin.

**Ana**, a suffix added to the names of famous men to designate collections of their sayings and table-talk, anecdotes about them, and notes in any way bearing on their life, e.g. Johnsoniana, Boswelliana, Shakespeariana. The use of such titles dates from the *Scaligeriana*, collected by the brothers Vassan and pub. in 1666 by Isaac Vossius.

**Anabaptist**, the name given to a Christian sect which appeared in Germany at the time of the Reformation, repudiating infant baptism (hence the name, meaning 'baptised again,' which refers to their adult baptisms) and teaching equality and community of all goods. The movement was begun about 1520 in Saxony by the 'Prophets of Zwickau.' They were strongly opposed by Luther, but their leader, Thomas Münzer, travelled over Bohemia, Thuringia, and Switzerland, preaching with much success, especially at Waldshut, on the Swiss border. He joined and largely engineered the 'Peasants' war' in S. and central Germany, and was executed after the defeat of his party at Frankenhausen in 1525. The doctrines of the

sect continued to be propagated by wandering preachers, such as Melchior Hoffmann, who in 1528 installed John Matthiesen as a bishop at Emden. He sent out many disciples, 2 of whom founded the new theocratic state of Münster in 1553. An era of wild licentiousness in this city followed, under the leadership of Johann Bockholdt, crowned in 1534 as prophet and king, assisted by Rothmann, Knipperdolling, Krechting, Kippenbrock, and Matthiesen. The city was besieged and taken by sev. Protestant princes in 1535, and on the execution of the leaders the movement began to die out, though still continuing in the Netherlands under David Joris (John of Bruzes) and others. A new era began with Menno Simons, who estab. a community which, while rejecting infant baptism, gave up the objectionable features of the A. creed. The Mennonites, who spread all over Germany, Switzerland, and Holland, practically correspond with the Baptist denomination in England, in which adults are re-baptised on joining the church. Menno's doctrines are expounded in his book, *Elements of the True Christian Faith*, written in Dutch. See E. B. Bax, *Rise and Fall of Anabaptists*, 1903; R. J. Smithson, *The Anabaptist to Protestant Heritage*, 1935.

**Anabas** is a genus of fishes of the family Anababidae, allied to the mullets and sword-fish. *A. scandens*, the climbing perch, resembles a perch to some degree. It has large scales, and can remain for a considerable time without water, even travelling overland in search of it. It has been stated that it is capable of climbing trees, and has been captured at a height of 5 ft. in a palm-tree.

**Anabasis**, the name of 2 Gk. historical works: 1. Xenophon's (fourth century B.C.), recounting the defeat of Cyrus the younger by Artaxerxes and the retreat of the 10,000 Gks. in his army under Xenophon. 2. Arrian's (A.D. 166-68), recording the campaign of Alexander the Great.

**Anableps** (from Gk. ἀνάβλεψεν, to look up) a genus of Malacopecterygious osseous fishes. They are remarkable for their projecting eyes, which have 2 pupils. The *A. tetraphthalmus* inhabits the rivers of Guiana and Surinam. Its anatomy was made the subject of a memoir by Lacépède, which was pub. in the second vol. of the *Mémoires de l'Institut*.

**Anabolism** (Gk. ἀνά, on high, βάλος, heap), the building-up process in the protoplasm of a living organism, as opposed to *catabolism*, or the breaking-down process.

**Anacardiaceæ**, an order of dicotyledonous plants growing chiefly in tropical countries. They are trees or shrubs which abound in an acrid resin. The flowers are usually in parts of 5, the stamens less than 10, carpels 3, with a single ovule. *Anacardium*, a small genus of A., includes *A. occidentale*, the cashew nut (q.v.).

**Anacharis** is synonymous with *Elo-dea*, a genus of water-plants of the order Hydrocharitaceae which grows in America. *A. (or E.) canadensis*, the Amer. waterweed, was transplanted to England, and now grows rapidly in our canals by vegetative multiplication.

**Anacharsis**, a Scythian philosopher, said to have been a friend of Solon, and the only barbarian admitted to Athenian citizenship. Some writers place him among the Seven Wise Men of Greece. Numerous witty sayings, among which was his saying that at Athens were men who deliberated but left the decision to fools, and proverbs preserved by Diogenes Laertius, Plutarch, and Lucian, are attributed to him. He was killed by the king of Scythia for worshipping Cybele with Gk. rites. Aldus, in his collection of *Greek Epistolographers* (Venice, 1499, 4to), pub. 9 letters under the name of A., which are pronounced by Bentley to be forgeries. The other works ascribed to A., such as an epic poem of 800 verses, a work on war, on the laws of the Scythians and some Gk. customs, are lost; but they were unquestionably not more genuine than the letters.

**Anacharsis the Younger**, see BARTHELEMY, JEAN JACQUES.

**Anachronism** (Gk. ἀνά, back, χρόνος, time), the reference of an event, custom, or expression to a wrong date. This is common in literature and other forms of art, especially painting, and although it most often is the result of an oversight and sometimes ignorance on the author's part, it is nevertheless sometimes a deliberately adopted device made for heightening a dramatic effect, or for achieving condensation. It is not easy to decide whether an A. is deliberately intended by the author. When Shakespeare peopled auct. Athens with Elizabethan joiners, weavers, and bellows-menders he may have been 'writing down' to his audience or have been unconscious of any A., but when he makes Cassius in *Julius Caesar* say, 'The clock hath stricken three,' the A. was probably intentional. In the sixteenth and seventeenth centuries A.s. abound in the works of dramatic and other writers, but it does not follow that artistic merit of their work is thereby spoilt. When Lucifer is expelled from heaven with the aid of cannons and gunpowder, the dramatic effect of Milton's story is increased, for by the time he wrote his *Paradise Lost* men had come to think always of battle as being enshrouded in a sulphurous canopy. Where, however, an attempt is obviously made to give correct local colour and A. is intended, the artistic harmony is disturbed. For Shakespeare to make, as he does in *Troilus and Cressida*, Agamemnon quote Aristotle, is almost as bad as when he places Verona on the sea-coast (the latter is an error, but not an A., for it has no reference to time). But Virgil, in making Queen Dido the contemporary of Aeneas, violates no artistic canons.

The Renaissance painters were frequently guilty of A., and the Flemish school even went to the length of putting spectacles on the noses of scriptural characters.

**Anacoluthon** (Gk. ἀν-, not, ἀκόλουθος, following), a term employed both in grammar and in oratory to imply lack of logical sequence, i.e. in which the latter half of a sentence does not correspond in construction with the first part. This is common enough in ordinary speech, but is deliberately employed in literature to add grace or emphasis. Example: 'And he charged him to tell no man: but go, and show thyself to the priest' (Luke v. 14).

**Anaconda**: 1. a S. Amer. water snake, allied to the boa-constrictor, which lives on the banks of rivs. in Brazil and Guiana. 2. The co. seat of Deer Lodge co., Montana, U.S.A. Has large copper-refining industry. Pop. 10,000.

**Anacreon**, Gk. lyric poet (c. 560-c. 476 B.C.), b. at Teos, Ionia, and emigrated to Thrace before the Persian invasion. About 540 he went to the court of Polycrates of Samos, and in 521 to the house of Hipparchus at Athens. He lived here till the fall of the Pisistratids, about 514, and then accepted the patronage of Echeocrates of Thesaly. He is said to have been choked by a grape stone. The Alexandrians possessed 5 books of his odes to the muses, wine, and love, but of these only a few genuine fragments remain. The Anacreontic odes trans. by Cowley and Moore are later imitations. A. was first ed. by Stephens in 1554. The 55 odes attributed to A. are in Fischer's ed. (Leipzig, 1793, 8vo); the best separate ed. of the fragments is by Bergk 1834, 8vo.

**Anadiplosis**, a figure in rhetoric and poetry, consisting in the repetition of the last word or an important word in a clause or line at the beginning of the next, as in 'He committed many crimes, crimes such as might be expected of a madman.'

**Anadyomene** (Gk. ἀναδυομαι, I rise from the sea), a surname of Aphrodite (or Venus) in allusion to her having arisen from the foam of the sea. The birth of Aphrodite was a favourite subject of auct. art, and furnished Praxiteles with a theme for his famous Aphrodite of Cnidos.

**Anadyr**, riv. of N.E. Siberia, rising in Lake Ivashkino, and flowing through the Chukchi country into the gulf of A. Length about 500 m. Area of basin, 115,000 sq. m. The tn. of A. stands on the riv. and is a coaling station for ships on the Arctic sea route, coal being mined in the neighbourhood.

**Anaemia**, deficiency of blood as a whole, or deficiency of the red corpuscles or of the haemoglobin leading to lack of colour in the blood. As. may be divided into primary, where the blood or blood-making organs only are at fault; secondary, where the A. is symptomatic of existing disease; and *leukæmia*, where the white corpuscles are greatly increased



in number. Of the primary *As.*, simple *A.* is the most common. It is characterised by general pallor, languor, and a tendency to fatigue; the general health is not much disturbed, and little can be done beyond a rigid attention to hygienic details, proper food, and care in the manner of eating and drinking. Another form of *A.*, *chlorosis*, or green sickness, is usually associated with adolescent girls, but is not so frequently met with as formerly. It is characterised by a greenish pallor, and is attended with headaches, palpitation, and a tendency to syncope. Pure air, plenty of rest and sleep, wholesome food, regular habits, and change of occupation if possible, generally bring about the cure in a few months. Progressive pernicious *A.* is a serious condition in which the red corpuscles are destroyed in huge numbers. Unfavourable surroundings, insufficient nourishment, or the exhausting effects of other disease favour the development of the *hæmolysis*, or destruction of the corpuscles, which may be immediately due to poisons generated in the gastro-intestinal capillaries. The progress of the disease is gradual, pallor increases, palpitation and shortness of breath become more noticeable, and the patient suffers more and more from headache, vertigo, and general debility until a peculiar lemon-yellow tint appears in the face, which is a characteristic symptom of the advanced stage. The disease usually attacks males in middle life, and in its worst form rarely yields to treatment. In 1926, Dr. G. R. Minot (U.S.A.) (who, with other Amer. doctors was awarded the Nobel prize in 1934 for co-operation in research on the blood) discovered the curative effect of liver in cases of pernicious *A.*

**Anæsthesia**, a condition of partial or complete insensibility, particularly to touch. It occurs in connection with diseases of the nerve centres, and is artificially induced for the purpose of conducting surgical operations.

The influence of certain substances in procuring some amount of insensibility to pain has been known for centuries, and there is evidence that opium, mandragora, and other drugs have been used on various occasions to lessen the sufferings attendant on surgical operations. In 1800 Sir Humphry Davy suggested the use of nitrous oxide, or 'laughing gas,' for operations where there was little effusion of blood, and at the beginning of the nineteenth century many observers remarked on the possibility of using the anæsthetic properties of ether in surgical operations. In 1847 the use of ether became general in England and America, and in Nov. of the same year chloroform was introduced by Sir James Simpson, and for a time entirely superseded ether. Other anæsthetics, such as ethyl chloride, were tried and abandoned, and chloroform held the field until recent years, when the value of other anæsthetics and mixtures used under certain con-

ditions have become better understood and recognised.

The chief anæsthetics in use at the present time are nitrous oxide, ether, chloroform, ethyl chloride, and chloroform-ether mixture for general *A.*; ether, eucaïne, novocaine, and cocaine for local *A.*; and stovaine, procaine, and novocaine for spinal analgesia.

**Nitrous oxide** ( $N_2O$ ) is used for short operations, such as occur in dental practice, and is practically free from danger and painful after-effects. It is supplied in a liquid state in steel cylinders, the cylinder being connected by means of a rubber bag to a face-piece designed to cover the nose and mouth. The period of induction is usually less than 1 min., and that of *A.* about 40 sec. The patient's eyes have a fixed appearance, and there is usually a dusky tinge of the face. Prolonged *A.* by nitrous oxide may be effected by the use of the nose-piece, through which the patient is encouraged to inhale the gas, expiring it through the mouth or through a valve in the nose-piece. It is thus possible to conduct dental operations lasting 5 or 10 min., or even longer, but the method is not employed if there is much nasal or post-nasal obstruction.

**Ethyl chloride** ( $C_2H_5Cl$ ) is used as a substitute for nitrous oxide in short operations, such as the removal of adenoids, but it is not considered so safe. The after-effects often include headache and sickness.

**Ether**, ( $C_2H_5$ )<sub>2</sub>O, is commonly used for operations of long duration. In the open method the ether is dropped on a gauze mask which is held at first some distance from the face and gradually brought nearer. By the use of a bag and face-piece, such as Clover's inhaler, *A.* is more quickly brought about. Ethyl chloride and ether are frequently used in sequence.

**Chloroform** ( $CHCl_3$ ) is administered at first in a dilute form and the percentage gradually increased, the supply of air and vapour being of course thoroughly under the control of the anæsthetist. Dangerous after-effects occasionally occur, and its administration is highly dangerous where the *status lymphaticus* exists. In cases where chloroform or ether may not be advisable, a mixture of 2 parts of chloroform to 3 of ether is often used, and is generally considered a safe and convenient anæsthetic.

**Local *A.* or analgesia** is chiefly employed in superficial operations or, where special circumstances make general *A.* inadvisable. Sometimes ether or ethyl chloride is sprayed on the skin until it freezes. Insensibility is produced for a short time and is only superficial. There is, likely, too, to be considerable pain when the skin thaws. Cocaine is often injected for cutaneous and sub-cutaneous analgesia, but its use is attended with some disadvantages. It has a dangerous effect when absorbed into the general circulation, and there is also a risk of a cocaine habit being formed. Eucaïne and novocaine are very effective analgesics

for hypodermic injection, and have no dangerous by-effects.

**Spinal analgesia.**—There are sometimes occasions for serious operations when respiratory affections, alcoholism, diabetes, and other conditions make general A. inadvisable. If the operation is concerned with the lower part of the body, it is possible by a spinal injection to produce insensibility to pain in that part whilst general consciousness is maintained. Stovaine or novocaine is injected just below the second spine into the spinal fluid while the patient is in a sitting position, if that position is possible. The method has been used more on the Continent than in this country, where it is looked upon only as a substitute for general A.

Instead of administration by inhalation, some anæsthetics can be used by injection into the rectum, or by injection into a vein. Among drugs used by intravenous injection are derivatives of barbituric acid.

**Trichlorethylene** ( $\text{CHCl}_2\text{CO}_2$ ), known as **Trilene**, a variant of chloroform, but less potent and less toxic. It has long been used in industry as a rubber solvent and for dry-cleaning. Vaporised accidentally it was found to induce unconsciousness and has since been used as an anæsthetic, particularly in obstetrics. A new pocket trilene inhaler, made for the purpose of deadening pain, may prove to be a great improvement on the morphine tubes equipped with hypodermic needle, which were used widely for the same purpose in the recent war. Exhaustive tests have shown that it is successful with 85 per cent of persons.

On the question which is the safest anæsthetic it would appear that nitrous oxide gas has been responsible for the fewest deaths, while it is said that no fatal result has attended the use of a mixture of that gas with oxygen. On the other hand this anæsthetic is now only used for very short operations, and for long operations chloroform or ether or a mixture of them must be used. Reliable statistics show that deaths due to chloroform are or were at the rate of 1 in 3000, while those due to ether were 1 in 16,000 (*Black's Medical Dictionary*).

In general, successful A. depends to a great extent on the proper preparation of the patient. The stomach should be empty at the time of the operation, so that no food can be forced up to lodge in the respiratory passages. Dangers during anæsthetisation are usually connected with the respiratory processes, and a skilful anæsthetist is always on the watch for any change for the worse. There is an impression abroad that deaths under anæsthetics are relatively on the increase, particularly in hospitals, but this is probably due to the fact that surgical measures are more often taken in desperate cases than heretofore, so that the enfeebled or diseased condition is really the cause of death rather than the anæsthetic. It may be said that with modern appliances and mixtures in the care of a trained anæsthetist

the risk to a person whose general health is anything approaching the normal is comparatively slight.

**Anagallis**, a genus of Primulaceæ growing in all continents but Australia. *A. arvensis*, common to Brit. cornfields, is the brick-red pimpernel. It is also called poor man's weather-glass, as the flowers close in the afternoon and in dull and rainy weather.

**Anagni**, episcopal city of Italy, on a hill 36 m. S.E. of Rome. The bishopric dates from the fifth century, and the cathedral of Santa Maria from the eleventh. Pop. 10,000.

**Anagram** (Gk. *ana*, back, *γράμμα*, an alphabetical letter), the transposition of the letters of a word or short sentence, more often the name of a person, by which a new word or sentence is formed. It is the essence of the A. that the new sentence should have an appropriate connection with the original sentence, and no better example can be given than that of a mediæval anagrammatist who answered Pilate's question, 'Quid est veritas?' (What is truth?) by 'Est vir qui adest' (It is the man who is here). Pseudonyms are often made by A., one of the most celebrated, albeit far-fetched, being *Voltaire*, formed from 'Aronet l. j.' (Arouet le jeune). Although in the past great virtue was found in the A., especially by the cabbalists, modern taste may be said to be represented fairly, if strongly, by Addison, when he said that it was impossible to decide whether the inventor of the A. or of the acrostic 'were the greater blockhead.'

**Anah**, a tn. on the Euphrates in the Bagdad vilayet, Iraq, opposite which is a line of cultivated is. Its position in the desert made it an important resting-place, and it contains the remains of 4 ant. castles.

**Anaheim**, a city of Orange co., California, U.S.A., 24 m. S.E. of Los Angeles. Pop. 11,000.

**Anahita** (Anaitis), a goddess once worshipped by the Persians. The Gks. associated her with Cybele. She was invoked side by side with Mithras.

**Anáhuac**, a geographical region of Mexico. The name was applied by the Aztecs to their whole kingdom, but its boundaries are not definitely known, and the term is now loosely used with regard to the great central plateau of Mexico. By some it is applied to this whole region, from Rio Grande to Tehuantepec, but it is more properly used of the plateau-valley of the city of Mexico, between 18° 4' and 20° 3' N. lat., having a mean elevation of 7500 ft. This region was formerly largely covered by lakes, which fits the meaning of the name 'on the water,' and is now the granary and stock-raising centre of the country.

**Anak**. The ancestor of the Anakim (Deut. II.) (see ANAKIM). Etymologically a common noun, 'necklace' (Song of Solomon, iv.) or perhaps 'neck' (Arabic *unq*, neck, *anaqa*, to embrace). If this be the correct derivation, the name

*bene* 'Anaq meant literally 'sons of the neck' or 'giants.'

**Anakapalle**, tn., Madras, India, 18 m. S.W. of Vizagapatam. Two m. off there are interesting Buddhist remains, preserved as anct. monuments. Pop. 18,000.

**Anakim**, an O.T. term for a section of the pre-Israelitic Inhab. of Canaan. They are represented as a race of giants, the sons of Anak (q.v.), living in S. Palestine, and were conquered by Joshua. They are also called descendants of Arba (as in Joshua xx, 13). Their chief stronghold was Kirjath-Arba.

**Analecta**, a collection of extracts from different authors, an anthology.

**Analectics of Confucius**, see CONFUCIUS.

**Analeptics** (Gk. *ανα*, again, *ληψις*, taking) is a medical term which comprises the means employed in restoring vigour to the system by diet or exercise. In dietary analeptic foods do not include stimulants with temporary action, but rich and nutritious foods which are of real restorative and permanent action, e.g. arrowroot, eggs, milk, and soups.

**Analgesics**, see ANÆSTHESIA; ANODYNES.

**Analogy** (Gk. *ἀναλογία*, proportion) is a term which originally implied an equality of ratios, but though anct. writers used it in this sense and it is still used with this meaning in mathematics, it is now used in many depts. of learning to signify resemblance which falls short of absolute identity. In inductive logic it forms the basis of most hypotheses, but it is subject to much fallacious reasoning. The reasoning runs on such lines as these: A and B resemble each other in possessing one or more similar characteristics; A possesses a certain additional characteristic, and B therefore probably possesses it also. In many cases such a train of thought will bring a true conclusion, as scientists can prove in hundreds of instances, but they usually require a mind which is capable of grasping what are the important points of the A. and forming a judgment from them alone.

A. can never afford proof; at best it is but a suggestion for a good hypothesis. Metaphorical language may be a source of incorrect reasoning by A., e.g. in speaking of a country as being a mother-country and from this arguing that the duties of the country towards the individual should be those of a mother towards her child. See J. S. Mill, *System of Logic*, 1875; W. S. Jevons, *Principles of Science*, 1877; J. M. Keynes, *A Treatise on Probability*, 1921; J. Cook Wilson, *Statement and Inference*, 1926.

**Analogy**, in biology, is a term applied to organs which perform the same functions though in shape and general structure they may be totally different. The wings of a bee and of a sparrow are analogous, and the leaf-like branches of butcher's broom are analogues of the leaves of ordinary plants. See HOMOLOGY.

**Analysis** (Gk. *ἀνά*, up, *λύειν*, to loose), in philosophy, implies the mental act of unloosening some unity into its component parts, e.g. the dissection in thought of a man into his various attributes of height, weight, reasoning powers, and so on. Synthesis is its complement, and implies the converse process of knitting together the parts to form the unity, e.g. the description of his various attributes, until the man is complete. A. plays a great part in inductive logic, for it opens with the complex of experience and resolves it into the elementary relations realised in it; in this way it is largely experimental and leads to discovery. The propositions set forth in geometry illustrate this; they are, however, usually synthetic in proof, but the *reductio ad absurdum* is wholly analytical.

**Analysis, Chemical**, the determination of the elements comprising a compound or a mixture of compounds. For inorganic compounds or mixtures the methods may be divided into dry and wet A. Dry methods usually only give an approximate result, and should be supplemented by wet methods, if possible. The chief processes in a dry A. comprise heating to determine what sublimate is formed, what gas is evolved, or what water of crystallisation given up, or whether any of the substances are oxidised. Heating on charcoal in a reducing flame would possibly give a metallic globule or other indications, and heating with borax on a platinum wire in an oxidising flame produces beads of different colours characteristic of the various metals. The flame test consists in heating a small portion moistened with hydrochloric acid in the high-temp. area of a Bunsen flame, when a characteristic colour may be imparted. Such methods obviously give only a general idea of the constituents of the mixture or compound; some elements may be masked by others unless a spectroscope (q.v.) be employed, when the presence of different elements in a flame test is very accurately indicated.

Wet methods consist of treating the given compound or mixture with reagents in a systematic manner, so that by the nature of the reactions produced, certain groups of elements are indicated, further tests subdividing these groups and so on until the original compound is split up into the simplest possible forms. Such an A. is called qualitative, because it takes no account directly of the relative proportions of the constituents. If those proportions be required, quantitative A. must be employed, which may be either gravimetric, volumetric, or colorimetric. In gravimetric methods it is designed to obtain a precipitate of known composition from a weighed quantity of the compound. This being carefully filtered, dried, and weighed, a simple calculation gives the percentage of the required element in the original mixture. Occasionally electrolysis of the given solution is resorted to, the amount of metal

deposited on the cathode indicating the strength of the solution. Volumetric methods aim at determining the strength of a solution of the substance by finding what quantity is required to bring about a certain definite reaction with another solution of known strength. Certain elements which give well-defined colour reactions with other substances can be determined quantitatively by comparing the colour produced by known weights of the substance with those produced by a standard solution.

The A. of organic compounds proceeds upon entirely different lines. If on burning a small quantity an ash or residue is left, the substance probably contains an inorganic impurity, which may be separated by the use of solvents, such as alcohol, ether, benzene, chloroform, etc., one or another of which dissolves the majority of organic compounds, when filtration and subsequent crystallisation in fractions may effect still further separation. Fractional distillation—that is, distilling at different temps.—is useful in separating liquids whose boiling-points are markedly different. The elements composing organic substances can be detected by characteristic tests; carbon by the formation of carbon dioxide turning lime-water turbid; hydrogen by the formation of water on decomposition; halogens by heating with sodium, when a sodium halide is formed; nitrogen by the evolution of ammonia on heating with lime; sulphur and phosphorus by oxidising to acids on heating with a mixture of potassium carbonate and nitre. The general principle underlying the quantitative determination of these elements is the collection and weighing of the products of combustion of a definite quantity of the substance. In recent years, accurate methods of qualitative and quantitative A. of very minute quantities of substance have been worked out (*micro-analysis*), e.g. by F. Pregl, and these methods have proved exceedingly useful and important in biochemistry, where the amount of material available for A. is often extremely small.

Modern research on the structure of the atom has led to the development of analytical methods based on electrical phenomena, and these enable us to detect even a trace of a particular element in the presence of large quantities of others. See F. Sutton, *Volumetric Analysis*, 1924; Treadwell and Hall, *Analytical Chemistry*, 2 vols., 1924; Thorpe and Whitley, *Manual of Organic Chemical Analysis*, 1926; A. I. Vogel, *Text Book of Quantitative Inorganic Analysis*, 1939; A. I. Vogel, *Text Book of Qualitative Chemical Analysis*, 1937; A. J. Berry, *Qualitative Inorganic Analysis*, 1938; H. Middleton, *Systematic Qualitative Organic Analysis*, 1939; N. J. Allport, *Colorimetric Analysis*, 1945.

**Analyst**, Public, an official appointed by a co. or bor. council under the provisions of the Food and Drugs Acts, 1875 and 1899, for the purpose of analysing samples of food and drugs and agric.

products exposed for sale. The appointment must be confirmed by the Ministry of Health or the Board of Agriculture, and the appointment cannot be annulled without the assent of whichever of these depts. is concerned. Under the latter Act both depts. are empowered to appoint a P. A. where the local authority has failed to do so. The P. A. is generally a F.I.C. (Fellow of the Institute of Chem.). For his duties see article on ADULTERATION.

**Analytical** (also known as Explicative or Essential) **Propositions** are those which affirm of their subject a predicate which is already contained in the definition of the subject. Such a proposition is,

'A parallelogram has four sides and four angles, the having four sides and four angles being part of the definition of a parallelogram.' A. P. are distinguished from *synthetical* propositions, which affirm of their subject a predicate not already contained in the definition, such as, 'A parallelogram is a distressful subject to the unintelligent schoolboy.'

**Anamalai**, or **Annamullay**, **Hills**, a group of mts. forming part of the Sahyadri range, S. India, about 85 m. S. of the Nilgiri Hills. The highest peak, Anamudi, is the loftiest point in S. India, attaining an elevation of 8850 ft. Tea and coffee are extensively grown here, and there is abundance of teak timber and wild beasts, such as the elephant and bison.

**Anambas Islands**, a group of small wooded and rocky is. in the Dutch E. Indies, between Borneo and Malacca.

**Anamnesia** (Gk. *ἀνάμνησις*, *anámnesis*, memory), a term used in medicine to signify the recollection of a patient or his friends of the first symptoms and past hist. of his case.

**Anamour**, or **Anamur**, **Cape**, is the most S. point in Asia Minor. It is named from A., the anct. Anemurium, in which there are ruins of tombs and 2 theatres. A. Castle is 6 m. E. of the cape.

**Ananas**, a genus of S. Amer. plants of the order Bromellaceæ. *A. sativus*, the pineapple, is the best-known species; for a description of its fruit see PINEAPPLE.

**Ananias**, a name borne by 3 characters in the N.T.: 1. A Jewish Christian of the young church at Jerusalem, who, with his wife Sapphira, was miraculously struck dead by Peter for making a false representation in respect of their gift of property to the community (Acts v.). 2. A Jewish Christian of Damascus, mentioned in connection with the conversion and baptism of St. Paul at that place (Acts ix.). 3. A Jewish high priest, who officiated at the trial of St. Paul before the Sanhedrin at Jerusalem and at Cæsarea (Acts xxiii., xxiv.). He was the son of Nedeбалos, and high priest about A.D. 47-59.

**Ananiev**, a tn. in the Kherson Region, Ukraine, on R. Tiligul, 95 m. N. of Odessa. Has some trade in agric. products. Pop. 20,000.

**Anapa**, seaport in Krasnodar ter., R.S.F.S.R., on the Black Sea. Founded

as a fortress in 1771 by the Turks, it was frequently taken and lost by Russia and finally annexed in 1829. The old rampart is now a promenade. Pop. 7000.

**Anapaest**, in poetry a metrical foot, consisting of 2 short, or unaccented, syllables followed by a long, or accented, syllable. It is the opposite to the dactyl, which has 1 long syllable followed by 2 short, and is sometimes called the antidactyl. Examples: 'temporal,' dactyl; 'interrupt,' A. The A. was often employed in Gk. and Rom. poetry, but its employment in England is generally restricted to the lighter forms of verse. In France the use of the A. is very general, forming indeed one of the marked characteristics of Fr. poetry. Aristophanes and Tyrtæus among the ancients, and Swinburne in our time have employed the A. with good effect.

**Anapli**, see **ΝΑΠΛΙΑ**.

**Anarchism** (Gk. *an-*, not, and *ἀρχη*, rule). A. may be defined as the negation of gov., as a state of society without a central gov., and in which individual autonomy is allowed its fullest development. The term *anarchy* is used to imply that state of turmoil which has usually accompanied the weakening of central gov., or the, usually brief, period when there is no gov.

Of late years attempts have been made by Anarchists by means of international conferences, notably that of Amsterdam, 1907, to define their position, and in a negative way their difference from Socialism (q.v.) was made plain by the expulsion of the Anarchists, led by Bakunin, from the International (see **UNDER THIRD INTERNATIONAL**) at The Hague Conference, 1872. Many of the tenets of Socialism are held by Anarchists, and their common opposition to the present order of society is a bond between them. Libertarian Socialism and Communist A. are practically synonymous terms, and the systematic destruction of property (sabotage) practised by the 'direct actionist' or non-parl. Socialists of France and elsewhere (also called Syndicalists) is little removed from the 'propaganda by deed' of the physical force Anarchists. The freedom of the individual being restricted by the monopoly of land and capital by a class, the Anarchist is at one with the Socialist in the desire to overthrow that monopoly, but they differ fundamentally on the question in whom that property should be vested, and on the governance of the remodelled society. The State Socialist's remedy for what he conceives to be the evils of present-day society is more gov., and better gov.; but the Anarchist holds that all gov., however well intentioned, are bad and tend towards privilege and oppression, and that the individual is just as much a slave if he has unwillingly to conform to the majority as if he conforms to a despot. His views are crystallised in the sentence, 'That gov. is best which governs least,' and in this conclusion he is not

far removed from such *individualists* as Herbert Spencer, Auberon Herbert, and Harold Cox.

The modern Anarchist movement may be said to have begun with Pierre Proudhon (1809-65), although an atmosphere favourable to its reception had been created by the writings of the poet Shelley and the Fr. encyclopædists. Proudhon's most celebrated work is that entitled *What is Property?* which he answers by the monosyllable, 'Theft.' He asserted that in a perfect society order would be maintained by the reasonable self-control of the free individual. Since his time perhaps the greatest Anarchist was Mikhail Bakunin, the Russian, the apostle Paul of A. (1814-76). In addition to writing many uncompromising works, including the atheistic *Dieu et l'État*, he will be chiefly remembered for his prolonged struggle in the International with the followers of Karl Marx, the father of orthodox Socialism. From this struggle Marx emerged victorious, but Bakunin had a large following, especially among the Lat. states. In recent years A. has numbered among its supporters many men of considerable erudition. Prince Peter Kropotkin, Russian, and Enrico Malatesta, It., made England their home, and the former wrote many scholarly works on Nihilism (q.v.), a form of A., chief among them being *Fields, Factories, and Workshops*, 1899; *The Conquest of Bread*, 1892 (trans. 1906); *The Memoirs of a Revolutionist*, 1899. The return to the simplicity of the primitive Christians advocated by Count Leo Tolstoy has given rise to the term Tolstoyan anarchy. Prominent Fr. anarchists include Elisée Reclus, Sébastien Faure, Charles Malato, and Louise Michel; It., Amilcare Cipriani; Sp., F. Ferrer; Amer., Emma Goldmann and Benjamin Tucker. 'Propaganda by deed,' repudiated by some Anarchists, is the violent attacks made upon rulers and sometimes indiscriminately on the better-off members of society, the *bourgeoisie*, by pistol, knife, and bomb. A. has a long list of crimes to its 'credit.' Britain's comparative immunity from these attacks has been attributed to the fact that it has no exceptional laws directed against A.; but the recent (1939) bomb outrages in the United Kingdom by the I.R.A. (Irish Republican Army) do not allow too much reliance to be placed on this fact. Among rulers to perish by the hands of Anarchists are: President Carnot of France, 1894; Empress Elizabeth of Austria, 1898; King Humbert of Italy, 1900; President McKinley of U.S.A., 1901. Ravachol (1892), Vaillant (1893), and Henry (1894) were all executed in Paris for bomb outrages on the public.

**Anarrhicas**, a genus of Acanthopterygious osseous fishes, very nearly allied to the Blennies. They have round, smooth, blunt heads; elongated bodies, covered with minute scales; a single long dorsal and an extended anal fin, both separated from the caudal; no

ventrals; the mouth armed with formidable teeth. One species, the wolf-fish, sea-cat, or cat-fish, *A. lupus* of Linnaeus, is common in the N. seas and on the E. coast of Scotland and the Orkneys.

**Anas** (Lat., a duck), the scientific name for a duck (*q.v.*).

**Anasarca**, dropsy of the subcutaneous cellular tissue. There are sev. forms of the disorder, one being known as *A. americana*, the S. Amer. sleeping-sickness.

**Anastasius**: 1. Pope, 398-402; chiefly remembered by his opposition to the writings of Origen, whose advocate, Rufinus, he excommunicated. 2. A. I., surnamed Dicorus, Byzantine emperor 491-518, succeeding Zeno, whose wife, Ariadne, he married. Ruled with great energy and justice. His reign was disturbed by the Isaurian (492-96) and the Persian wars (502-5), and by invasions of Slavs, Huns, and Bulgarians. 3. A. II., surnamed Artemius, Byzantine emperor 713-16. Deposed by a mutiny of the navy, which proclaimed Theodosius III. in his place. A. became a monk in Thessalonica, but later headed a revolt against Leo, the successor of Theodosius, and was executed.

**Anastomosis**, the intercommunication of blood-vessels, so that the supply of blood to any part of the body is not wholly dependent upon one channel; it is particularly free around joints. The term is extended to apply to the establishment of a communication between 2 hollow parts, or 2 different portions, of the same organ.

**Anata**, a vil. of Palestine, 3 m. N.E. of Jerusalem. It is supposed to occupy the site of the anc. Anathoth, the bp. of Jeremiah. It possesses various anc. remains.

**Anatase** (Gk. *anatasis*, extension), or **Octahedrite**, also called **Olsanite** and **Dauphinite**, is a mineral form of titanium dioxide. The crystals have either many pyramidal faces or occur as simple acute double pyramids. They are found in granite crevices in Switzerland and Le Bourg d'Oisans in Dauphiné.

**Anathema**, literally 'that which is set aside, or offered.' Used by the Gks. in respect of gifts made to the gods either in gratitude or for propitiation. As animals so offered were condemned to death, the word has gained a secondary sense of perdition. The word A. was used by the Catholic Church as part of the formula in the excommunication of heretics. In 1 Cor. xvi. 22 occur the words: 'If any man love not the Lord Jesus Christ, let him be Anathema Maran-atha.' The word Maranatha has for this reason erroneously been thought to be an amplification of the curse, but its meaning is merely 'the Lord cometh.'

**Anatidae** (Lat. *anas*, duck), a family of web-footed birds belonging to the div. **Carinatae** of the order **Neornithes**. It includes swans, geese, and ducks among its 150 or so species.

**Anatolia**, 'Land of the Rising Sun' or Orient, the Gk. name for Asia Minor. See **ASIA MINOR**; **TURKEY**.

**Anatoliko**, or **Ætolikon**, a tn. of Greece, built on an ls. 6 m. N. of Missolonghi. It exports fish and oil, and cultivates the vine and olive. Pop. 3500.

**Anatomy**, or **Morphology**, the study of the form or structure of a living thing. Thus there are 2 prin. divs., vegetable A. and animal A. If the latter is concerned with the structures of various classes of animals as compared with one another it is called **Comparative A.** When one particular species of animal is the object of study the science is called **Special A.**, of which **Human A.** therefore forms a branch. It is in this latter sense that the term 'anatomy' is generally applied. It consists in the observation of the form of the various organs and tissues, the materials of which they are composed, and their possible variations, as distinct from physiology, which deals with the functions of these parts. Thus the work of the anatomist is to investigate and describe the shape, size, position, and construction of organs, etc.; he will, for instance, describe the various parts of the liver, the substances of which it is composed, and the position of the liver with regard to other organs, whilst the physiologist will deal with the problem of how the liver makes bile, and how the work it does affects the constitution of the blood and the whole process of nutrition. **Human A.** itself is a wide subject, to be approached from sev. points of view, and the investigation of a single part has provided a lifelong study for many a scientist. **Descriptive A.** is a study of the separate and individual parts in the body, apart from their relationship to surrounding parts; **Microscopic A.** deals with facts gleaned from microscopical examination; **Morbid or Pathological A.** is a study of diseased or abnormal structures; and **Practical A.** deals with the body as a subject for dissection. **Artistic or Surface A.** is an allied subject, and deals with the position of the various structures only so far as they affect the outward appearance for the purpose of representation by painting, sculpture, etc.

The organs may be classified according to function into systems, as the **skeletal system**, comprising the bones and ligaments; the **muscular system**; the **respiratory system**, comprising the lungs, windpipe, diaphragm, etc.; the **circulatory system**, comprising the heart and blood-vessels; the **alimentary system**, comprising the stomach, intestines, liver, and all those organs concerned with nutrition; the **excretory system**, comprising the kidneys, bladder, etc.; the **reproductive system**, comprising the ovaries, testes, etc.; and the **nervous system**, comprising the brain, spinal cord, nerves, and organs of sense. The organs are composed of tissues, of which the epithelial, the connective, the muscular, and the nervous tissues may be taken as the prin. groups.

The introduction of radiography into medical science has been of benefit not only to the physiologist, but also to the anatomist. In the living body the anatomist is now able to study the interdependence of various organs during life, to find out where weight is exerted in natural circumstances, to discover at what age and at what precise points ossification of the bones takes place; and he is also enabled to determine the normal positions of such organs as the heart and the stomach while performing their ordinary functions.

When an X-ray photograph has been taken of the bones, the shadow-picture is made clear because of the solidity of the bones, but where the stomach is under review a 'test meal' of some such nature as porridge mixed with the innocuous and tasteless carbonate of bismuth is administered to make the organ opaque to the anatomist. By the injection of compounds of iodine into the lungs, and of oxygen into the brain, these organs are also enabled to show up clearly in the X-ray photographs.

Consult J. Quain, *Elements of Anatomy*, 1893-1900; A. M. Buchanan, *Manual of Anatomy*, 1925; H. Gray, *Anatomy, Descriptive and Applied*, 23rd ed., 1926; E. R. Bundy, *Textbook of Anatomy and Physiology for Nurses*, 1940.

Anaxagoras (c. 500-428 B.C.), Gk. philosopher, b. at Clazomenae, Ionia. About 484 he went to Athens and taught there for 30 years, among his pupils being Pericles, Euripides, and perhaps Socrates. He exerted great influence, both on account of his mathematical and astronomical wisdom and the ascetic dignity and strength of his character. His attempts to explain physical phenomena by natural means laid him open to the charge of impiety. He was acquitted after being defended by Pericles, but left Athens for Lampsacus on the Hellespont, where he d. He laid the foundations of the atomic theory, and believed in an infinite intelligence in the universe.

The chief treatise of A. was on nature, sev. fragments of which have been preserved by Simplicius and others. Vitruvius attributes to him a work on perspective.

The leading notion of A. was that all things were in a state of confusion till Nous (Intelligence) placed them in order. Many strange opinions on physical philosophy are attributed to him. He said that the sun was a mass of hot iron larger than the Peloponnese; his opinion that the moon derived her light from the sun is probably not his own. His fragments were collected by W. Schorn, Bonn, 1829.

Anaxarchus of Abdera (fourth century B.C.), Gk. philosopher, and intimate friend of Alexander the Great, to whom he is supposed to have spoken with the greatest liberty. The story is told of him that when, on the instructions of Nectaneos, the satrap of Egypt, whose hatred he had incurred, he was pounded

in a mortar, he cried out, 'You may crush my body, but you cannot crush my soul.' He preached the doctrine that the greatest happiness was to be found in virtue.

Anaximander, Gk. philosopher, b. at Miletus, Ionia, c. 611 B.C. Little is known of his life. He probably d. c. 547 B.C. He was a pupil of Thales, a student of astronomy and geography, a pioneer of exact science, and the author of a theory of nature originating in an indeterminate 'first principle.'

Anaximenes, Gk. philosopher, b. at Miletus, Ionia, in the latter part of the sixth century B.C. Said to have been a pupil of Anaximander. He considered air to be the source of all matter, from which it (matter) was formed by condensation.

Anca, see ARAUCANIAN.

Ancah, a coast prov. of Central Peru. Area 10,500 sq. m. Lies partly in the Cordilleras, partly in the Marañon R. valley, and partly on arid coast land. Produces wheat, barley, coffee, and tropical fruits; mining is an important industry. Pop. (1940) 425,000. Chief tn. Huaraz (cap.).

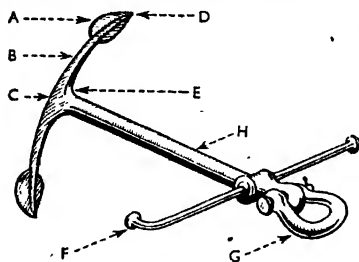
Anenis, a tn., dept. Loire-Inférieure, France; situated on the Loire, 21 m. N.E. of Nantes. Pop. 14,000.

Ancestor Worship, the basis of many religions, and by some extremists maintained to be the basis of all religions. The line of demarcation between gods and men is clearly and distinctly drawn in Greece, but Euhemerus expounded a theory that the gods of Greece were merely men who had gradually acquired divine honours on account of exceptional prowess or benevolence during their lifetime. This type of rationalism is called, after the originator, Euhemerism. Thus even Zeus, the supreme god of the Pantheon, was merely a heroic warrior, whose tomb was located in Crete. The application of this theory to the gods of Greece in general is extravagant, though there is a shade of justness in its application to the origin of the worship of Dionysus and Heracles. While the worship of the gods, as such, in Greece is on the whole distinct from A. W., the worship of heroes was a prominent feature of Gk. ritual, but this worship did not lead to deification. The same distinction is true of Rom. worship. Spirits of the dead, called *manes*, were worshipped with ritual distinct from that bestowed on the gods. They dwelt in the under-world, and access to their abode was obtained through the *lapis manalis*, a stone covering the entrance to a pit; and these *manes* were regarded as partaking of food and drink. It is characteristic of the spiritual nature of Heb. religion that A. W. was not practised. A. W. is undeniably the basis of religion in China and Japan. The Hindus also attached great importance to the power of departed spirits, and believed that all their actions were regarded by these deities. The totem-pillar is characteristic of the worship of the Amer.-Indian,

and the 'ancestor-tablet' was the object of strict veneration among the Maoris. A. W. therefore, is a characteristic of the religion of most primitive peoples, and in many cases results in deification. The subject is exhaustively treated by Herbert Spencer in his *Principles of Sociology*, 1877-96.

**Anchises** was the son of Capys and Thonis, the daughter of Ilus, and king of Dardanus on Mt. Ida. He became the father of Æneas by Aphrodite. He was struck by lightning and became blind for having boasted of his intercourse with the goddess. When Troy was captured by the Gks., A. at first refused to leave the tn., but was at last persuaded to do so by Æneas, who carried him on his shoulders from the burning city. (See Virgil's *Æneid*, II.) A. d. soon after Æneas arrived in Sicily, and was buried on Mt. Eryx.

**Anchitherium** (Gk. ἀνχίτιον, near, θηρίον, wild beast), a genus of mammiferous fossils of the Upper and Lower Miocene found in Europe and N. America. It was related to the horse, and resembles that species more closely than any of the Palæotheriidae. It belongs to the div. Perissodactyla of the order Ungulata. Each limb had 3 toes, a large central one and 2 smaller lateral ones.



ANCHOR

A, palm, blade (or fluke); B, arm; C, crown; D, bill (or pea); E, trend; F, stock; G, shackle (or eye, or ring); H, shank.

**Anchor**, an instrument used for the purpose of fixing the position of a ship by fastening it temporarily to the bottom of a riv. or sea. The word is derived from the Gk. ἄγκυρα, meaning a hook. By its use drifting with currents, tides, and wind is prevented. The A. is attached to the ship by a cable. It is of early origin, though the primitive forms it took were not more scientific than large stones or sacks of sand. The first hook A. has been traced to the Gks. The modern implement is composed of the following parts: a vertical beam called a shank, at the upper end of which is a metal ring called a shackle, just beneath the shackle is a cross-beam called the stock. The shank thickens at the trend, at the opposite end, into the crown, whence 2 arms extend at right angles to the shank and curve upwards. They terminate

in broad wedges called palms or blades, the pointed ends of which are termed bills. The As. used by the Admiralty bear no stock, and have movable blades so arranged that they grip the bed of the sea irrespective of any position the A. may assume. This type is known as the Wasterneys-Smith.

**Anchorage**. In special areas, a fee is chargeable to the captains of those vessels who wish to cast anchor in them. Generally the ownership of the area is restricted to the state which receives the toll, but sometimes private companies and, rarely, separate individuals own the reserved water. The word also means anchor-ground, i.e. a bed composed of stiff clay or firm sand.

**Anchor Ice** (Ground Ice) is a form of ice which adheres to the bottom of only those waters which are characterised by a never-ceasing tempestuous motion. The ice is very porous, and as it rises it often brings to the surface any matter to which it may be adhering. It forms only in a temp. lower than 10° F. Until zero its adherence to the bottom is not of any strength.

**Anchorite**, one who voluntarily secludes himself from all intercourse with his fellow mortals for the purpose of undisturbed and holy reflection. Among the attendant, and in some part, necessary, practices was a rigid asceticism. The first A. was Paul of the Thebaid (Egypt), among his followers being the famous St. Antony.

**Anchovy**, a small fish belonging to the herring family. It is found abundantly round European coasts, particularly those of the Mediterranean. It is recognised by the deeply-marked fork of its tail, the dark green of its back, and the projection of its snout over the under part of the mouth. The industry has declined recently. A light is used to attract the fish and a net accomplishes their capture. This takes place near the shore, to which they make for the purpose of depositing spawn.

**Anchovy Pear**, a tree indigenous to the marshy dists. of Jamaica and the W. Indian Is. It attains a height of 50 ft. and bears leaves from 2 to 3 ft. long. The fruit resembles the F. Indian mango.

**Anchusa**, a genus of plants of the order Boraginaceae, 3 species of which are found in Britain. They are employed in the manuf. of dyes and medicines. *A. officinalis* is the common alkanet; *A. arvensis* or bugloss; *A. sempervirens*, or evergreen alkanet.

**Ancient Buildings, Society for the Protection of**, see PROTECTION.

**Ancient Demesne**, a term which signifies estates or manors vested in the king at the time of the Norman Conquest. Freedom from many of the prevalent duties attached to tenants was a privilege attached to them; among these exemptions were freedom from the Dane-geld, from tolls and duties, from fines, and from sitting on juries. The conditions attached to their ownership gave rise to the modern 'freehold' property.



**Ancient Lights**, see LIGHTS, ANCIENT.

**Ancient Mariner**, the famous poem of Samuel Taylor Coleridge, was first pub. in the *Lyrical Ballads* of 1798. Its theme is the superstition which attaches dire consequences to the killing of an albatross, and its moral that 'He prayeth best who loveth best All things both great and small.'

**Ancient Monuments, Act for the Protection of**, see PROTECTION.

**Ancients and Moderns**. The celebrated controversy between the A. and M. which raged in Fr. and Eng. literary circles at the end of the seventeenth and beginning of the eighteenth centuries centred on the respective merits of classical and modern literature. Though not the first protest against the worship of the classics, the *Traité pour juger les poètes grecs, latins et français* of Desmarets de Saint-Sorlin pub. in 1670, in which he attacks Homer and Virgil, and the work of the same author entitled *Discours pour prouver que les sujets chrétiens sont les seuls propres à la poésie héroïque*, may be said to have actually started the dispute. For these he received severe handling from Boileau in his *Art poétique* (1674), to which Desmarets replied with his *Défense de poème héroïque*, 1674, and *Défense de la poésie et de la langue française*, 1675. Subsequently the cause of the M. found its chief champions in the brothers Perrault, who for many years kept up the dispute with such doughty opponents as Boileau and Racine. An important contribution to the case of the M. was Fontenelle's *Digression sur les anciens et les modernes*, 1688. In England the dispute commenced with the publication of Sir William Temple's *Essay upon the Ancient and Modern Learning*, 1692, written from the classical side, and answered by Wotton's *Reflections upon Ancient and Modern Learning*, 1694. In his defence of classical literature Temple strangely enough found himself opposed to Bentley, the most brilliant classical scholar of the day, who secured a signal triumph in the controversy by proving the spuriousness of the *Letters of Phalaris*, upon which Temple had bestowed high praise. The outstanding literary contribution to the discussion is Swift's *Battle of the Books*, 1701, written in favour of the classical view.

**Ancilla** (Lat. *ancilla*, handmaiden), or **Ancillaria**, the name given by Lamarck to a genus of spiral, univalve, marine shells belonging to the family Olividae. They are chiefly confined to tropical climates, and are found in the retaceous system. They are gastropod molluscs of the order Ctenobranchiata.

**Ancillon, Charles** (1659-1715), historian and a staunch defender of the Protestant cause, was a native of Metz and son of the noted Protestant divine, David A. His chief works are: *L'Irrévocabilité de l'édit de Nantes*, 1688; *Histoire de l'établissement des Français réfugiés dans le Brandebourg*, 1690; and *Histoire de Soliman II.*, 1706.

**Ancillon, David** (1617-92), a learned Fr. Protestant divine, was b. at Metz and d. at Berlin. In 1641 he was licensed to preach by the synod of Charenton, and appointed minister at Meaux. In 1653 he accepted a call for Metz, and officiated until the revocation of the Edict of Nantes compelled him to retire to Frankfurt. He wrote scholarly works in defence of the reformed faith. See *Mélange critique de littérature recueilli des conversations du feu M. Ancillon* (Basel, 1698).

**Ancillon, Johan Peter Friedrich** (1767-1837), Prussian historian, of Fr. extraction, b. in Berlin. Great grandson of Charles A. (q.v.). His family emigrated during the revolution following the Edict of Nantes. In Berlin he became tutor to the crown prince of Prussia. In 1832 he was appointed foreign minister. He is celebrated as the author of *Révolutions du système politique de l'Europe*. The value of his work lay in its recognition of the psychological element in the great movements of hist.

**Ancon**, a S. Amer. seaport in the dept. of Lima, Peru. Pop. 31,000.

**Ancona** is the cap. of the prov. of that name in Italy. It is situated on the shores of the Adriatic Sea. Its name is derived from the Gk. ἀγκών, which means a bend, its position being on a bend of the coast. It is the most important seaport between Venice and Brindisi, and is a railway centre. Its position renders it advantageous as a naval station. Many steamship routes have a terminus at A. Its chief exports include grain, hemp, goat-skins, and silk. The tn. possesses a fine cathedral. It was first colonized, c. 390 B.C., by refugees from Syracuse. In the Middle Ages it became a republic, and later it was annexed to the papal states. The Sardinians captured it in 1860. Its harbour is the finest on the S.W. coast of the Adriatic Sea. Asphalt and calcium carbide abound in large quantities and are extensively exported. The city, with its famous monuments, suffered heavily in the Second World War, the damage being caused by bombing of the port. The cathedral, S. Ciriaco, lost its roof and sev. direct hits by bombs severely damaged the walls, though the building can be restored without grave loss of character. The churches of S. Anna and S. Pietro were destroyed. The campanile of S. Francesco delle Scale was destroyed; the museum was hit and mostly demolished, but the paintings had been removed; the communal library was buried under fallen masonry; and there was other minor damage. Sev. of the most important buildings escaped damage. Pop. 89,200.

**Ancona, The**. An It. liner sunk by an Austrian submarine in 1915 in the First World War. Sev. U.S. citizens perished. The Austrian reply to the Amer. note of protest alleged their belief that the vessel was a transport and that in any case she tried to escape.

**Ancona, Alessandro d'** (1835-1914

It. man of letters, a native of Pisa, educated at Florence and Turin. At the latter place he took a prominent part in the agitation preceding the war of independence and represented the Tuscan Liberal party. In 1859 he founded and for some time ed. *La Nazione*. In 1860 he was appointed prof. of It. literature at the Univ. of Pisa. He ed. Dante's *Vita Nuova*, and various other works of It. writers. Among his original works on literary and dramatic subjects may be mentioned: *Sacre Rappresentazioni dei Secoli XIV., XV., e XVI.*, 1872; *Origini del Teatro in Italia*, 1877; *I Precursori di Dante*, 1874; and *La Poesia popolare Italiana*, 1878. In 1882 was pub. his autobiography, under the title of *Il Primo Passo*.

**Ancre, Battle of the.** This battle was merely an extension of the great Somme battle of July to Aug. 1916. It was fought in mid-Nov., and was the only Brit. effort on the W. front between the Somme battle of 1916 and Arras in Apr. 1917. The Gers. were entrenched in chalk and clay excavations near the riv. The capture of the Schwaben redoubt in the Somme battle had left the Brit. Fifth Army in a good position N. of Thiepval for enfilading these excavations. The actual attack began, after 2 days' artillery bombardment, on Nov. 13, in a thick mist at 6 a.m., 3 Brit. divs. under Gough taking part, the 31st (chiefly Yorkshire battalions) being foremost in the advance. Together with these were machine-gun sections of the Lucknow and Sialkot Cavalry Brigades, who repulsed a severe counter-attack 4 hrs. later. Great losses were sustained by the 3rd Div. on the S. of the 31st Div. on ground between Serre and the riv., a strip of ground on which a quite extraordinary number of Brit. soldiers fell in the course of the war. Some success was obtained by the 2nd Div. on the right of the 3rd; but the divs. which were operating further S., where the high ground between Serre and Beaumont Hamel gave protection from the Ger. artillery at Bucquoy in the N., fared much better, capturing St. Pierre Divion vil. and Beaucourt and clearing the enemy from the last trench system between the Brit. front and the riv. Co-operating with these infantry divs. was the 63rd Naval Div., some of the men of which had fought at Antwerp in 1914, and which comprised 10,000 men, who attacked N. of the riv. under a fortuitous screen of dark and misty weather. Heavy losses were, however, suffered in the centre of this div. through a formidable concealed Ger. redoubt bristling with machine-guns. It was not till 7 p.m. that the actual assault on Beaucourt was ordered. The charge was directed by Commander Freyburg of the Hood (Naval) Brigade, and was undertaken with great dash by combined sailors, riflemen (Rifle Brigade and Royal Fusiliers), and members of the H.A.C. The riflemen, reappearing on the further side of the vil., then consolidated their new positions

and threw a pontoon across the riv. so as to link up with the 39th Div. on the S. Meanwhile the Ger. redoubt still held out. Three tanks (so far these engines of war had not been an unqualified success) were brought up but their performance was eloquent alike of their weakness and of their value at this early stage of their development. Two were hit or became bogged in the mud; the third lumbered across to the enemy line and so frightened the garrison of the redoubt that it promptly surrendered. In these 2 attacks of the 31st and of the Naval Div. some 3500 prisoners were taken; 1500 more were captured in a brilliant attack by the 51st Highland Territorial Div. operating on the left of the Naval Div. The strongly organised and important vil. of Beaumont Hamel was taken and a great haul of machine-guns was made. While the action of Beaumont Hamel was being fought, the remaining divs. S. of the Ancre, of Gough's Fifth Army, also advanced, and made a little headway in the direction of Grandcourt and Petit Miranmont; but heavy losses were suffered by the 14th Brigade at a position called the Munich line during very severe fighting by the 32nd Div. to fill up the gap between Gen. Gough's right and Gen. Rawlinson's left (Fourth Army). A further advance was planned for Nov. 17, but was delayed by weather, the morass-like condition of the trenches, and the tremendous sustained Ger. barrage fire. Two companies of the 2nd Manchester lost half their numbers on that day. At dawn on the 18th, though bomb supplies were lacking, the new advance was begun, the 15th Highland Light Infantry, the King's Own Yorkshire Light Infantry, and the residue of the Manchester's gaining some ground, much of which was lost by a prompt counter-attack. It was the same tale all along the front—the shortage of bombs had rendered useless such gains of ground as were made. This battle was the last combined operation of 1916 and is usually claimed as a Brit. victory.

**Anore, Concino Concini, Marshal d'** (assassinated 1617), a Florentine, was an attendant of Maria de' Medici, a wife of Henry IV. He married Leonora Salgari, one of the queen's women, and with the co-operation of his wife succeeded in aggravating the unhappy relations between Henry IV. and Maria. Upon the king's death he became marshal of France, possessing, extraordinarily enough, no military knowledge or experience. His prodigality was as lavish as it was childish.

**Anoren Riwe** (anchoretess's rule), a prose treatise written in M.E.; it dates probably from the early part of the thirteenth century. It was designed specially for a small body of religious zealots consisting of 3 women and their servants. They occupied a monastic house at a place called Tarrant Crawford in Dorset. The religious house of Tarrant was founded by Ralph de Kahaines.

While the doctrines believed and the observances followed were quite independent of any existing creed, yet later, in 1286, evidence shows that the inmates had joined the Cistercian order. Of the A. R. there exist 7 Eng. MSS. and 1 Lat. The authorship is attributed to Bishop Richard Poor, associated with the endowment of the monastery. Its theme is the need for rigorous renunciation, though the severity of its tone is softened somewhat by the affectionate phrasing. It also contains an interesting account of the early Eng. church doctrines.

**Ancrum**, a vil. on the Alne water, a trib. of the Teviot in Roxburghshire in Scotland. Its name is derived from *crom*, a bend, as it is situated on a bend of the Alne. It possesses many historical associations, and is famous for the battle of A. between the Eng. and Scots in 1545, when the Eng. were defeated. Pop. 1000.

**Ancus Marcius** (640-616 B.C.), a legendary king of Rome, who in spite of peaceful inclinations was forced to war with the Latins, whom he conquered. He founded the port of Ostia and established works and erected a prison. (Livy, I. 32, 35; Dionysius, III. 36-45.)

**Anacylus** (Gk. ἀνακύλος, bent), a genus of fresh-water snails, often called riv. limpots. They belong to the family Limnæidae and order Euthyneura of the gastropod molluscs. Their lungsacs always contain water, and they cannot breathe on land. They are found in springs and streams, adhering to stones and leaves.

**Ancyra**, an anct. city of Galatia on a trib. of the Sangarius. It was once a centre of the Tectosages, 1 of 3 Gaulish tribes who settled in Galatia in 232 B.C. An important ecclesiastical synod was convened there in A.D. 314.

**Ancyra**, Asia Minor, see ANKARA.

**Andalusia**, formerly a prov. of Spain, but divided since 1833 into 8 provs., Almería, Cádiz, Cordova, Granada, Jaén, Huelva, Málaga, and Seville. A. is a great plain enclosed by mountains except on the S.W. Parts of it are sterile, but most of it is very fertile. Its chief riv. is the Guadalquivir, which flows in a S.-westerly direction to the gulf of Cádiz. It has great natural riches. Some of its products are world famous, e.g. its sherry, and the copper mines of Río Tinto. Many of its products are those of an oriental climate, e.g. the cactus plant, the orange, and the sugar-cane. Agriculture is rather backward and certainly primitive. Its chief tns. are Seville, Málaga, Granada, and Cordova. It has passed through the hands of Carthaginian, Rom., Gothic, and Moorish conquerors, and all have left their mark on the prov. Its architecture is famous; its people lively, quick-witted, and of mixed race; its language dialectic and obviously influenced by the Moorish conquest. Area about 33,700 sq. m. Pop. 4,000,000.

**Andalusite** (from *Andalusia* in Spain), an anhydrous silicate of alumina found in France, Spain, and N. America.

It occurs crystallised in the orthorhombic system, usually in square prisms. In colour it is flesh-red to brownish, greyish-red, and violet.

**Andaman Islands**, a group of is. in the bay of Bengal. They number 204 and vary in size. Total area is 2500 sq. m. The main portion consists of 5 large is. so closely connected that they are called 'Great A.' Their names in order from N. to S. are, N. A., Middle A., S. A., Baratang, and Rutland Isle. The 4 straits separating them are Austin Strait, Homfray's Strait, Middle Strait, and Macpherson Strait. The Little A. group on the S. has been used, since 1858, by the Gov. of India as a penal settlement for life and long-term convicts, but the practice is being discontinued as it has had a deleterious effect upon the natives morally. There were 6000 convicts there in 1941. The Brit. settled there in 1789, in the N. A. Is., but abandoned the place for Penang. The cap. of the present settlement is Port Blair, in S. A. Its harbour is one of the finest in the world. There are other harbours and safe anchorages, including Port Cornwallis and Bonington. The climate is warm, tempered by pleasant sea breezes and the modifying influence of the sea. The is. are densely wooded, and among the best known timbers is A. redwood (or *padouk*). Coco-nut and rubber are successfully cultivated. There is wireless communication with Burma and Madras. Raided for the first time by Jap. bombers in Feb. 1942. Jap. forces occupied the is. on Mar. 23, 1942, but surrendered them in Aug. 1945. The total pop. of the is. (excluding the aborigines) in 1941 was 21,500.

**Andante** (It. *andare*, to go), in music, is one of the 5 prin. tempos, and is the medium between *adagio* and *andantino*. It indicates a steady calm movement, and strict equality in the measure of each bar. It is often modified, as *A. maestoso*, slow and majestically; *A. cantabile*, slow, in a singing style; *A. ma non troppo*, slow, but not too slow.

**Andantino** (It., dimin. of *andante*), in music, a movement a little faster (originally slower) than *andante*.

**Andaquí**, formerly an important confederacy of Indian tribes occupying the head-waters of the Caqueta and Magdalena Rr. in S. Colombia. During a period previous to the Sp. conquest they enjoyed a high state of civilisation, evidence of which is afforded by various remains of temples and other buildings. A warlike fragment still occupies the head of the Fragua R.

**Andelys, Les**, a tn., consisting of 2 parts, Petit-Andely and Grand-Andely, in Eure, France. It contains a very anct. Gothic church, and the ruins of Château Gaillard, built by Richard Cœur de Lion in 1193; and was the bp. of Henri and Roger Trouvères, Adrien Turnèbe, Blanchard, Brunel, and the painter Poussin. It trades in cattle, grain, leather, and silk goods. Pop. 5500.

**Andenne**, a tn. in Belgium, 12 m. E.

of Namur. Its manufs. include paper, porcelain, and tobacco-pipes (an industry dependent upon a bed of pipe-clay). A. was one of the Belgian tns. whose inhab. especially suffered at the hands of the invading Gers. in the 1914 invasion. It is particularly mentioned with other places in Cardinal Mercier's famous pastoral letter. In a proclamation dated Aug. 22, 1914, Gen. von Bülow, in an attempt to condone the outrages committed, alleged that the inhab. of the tn. made an attack on the Gers. after manifesting peaceful intentions. Hence he assented to the proposal to burn the tn. and shoot 100 of the citizens by way of warning to the people of Liège. Some 200 civilians were killed and a still larger number deported. Pop. 8000.

**Anderab, or Inderab**, a tn. of Afghanistan, on the Hindu Kush Mts. in a fertile dist.; pop. 6500.

**Anderida**, see PEVENSEY.

**Anderlecht**, a tn. in Brabant, Belgium. One of the main suburbs of Brussels. S.W. of the city itself. Important cattle market and slaughter-houses. Pop. 85,000.

**Anderlues**, a com. of Hainault, Belgium, 7½ m. W. of Charleroi. Coal mines. Pop. 12,000.

**Andermatt**, otherwise **Urserna**, a Swiss vil. in the canton of Uri. It is situated 18 m. S. of Lake Lucerne, and is a noted tourist centre, as it lies at the junction of the Furka Pass with the St. Gothard road. Elevation 4000 ft. Pop. 1100.

**Andernach**, a tn. on the Rhine belonging to the dist. of Coblenz. It was once a Rom. fortress and bore the name of Antunnacum. Later it became a residence of the Merovingian kings. The tn. has an atmosphere of medievalism. Its industries are the manuf. of millstones and cement. Pop. 12,500.

**Andersen, Hans Christian** (1805-75), a most popular Dan. writer, and one of the greatest children's story-tellers of the world. He was b. at Odense in Fünen, son of a sickly shoemaker, who d. in 1816. Thrown on his own resources he built himself a toy theatre, made clothes for his puppets and read borrowed plays, especially those of Shakespeare and Holberg. It was thought to teach him tailoring, but he wanted to be an opera singer and set out for Copenhagen, where he was taken for a lunatic and rebuffed at the theatres. Befriended by the musician Weyse and the poet Guldberg, he became a dancing pupil at the Royal Theatre where, eventually, he gained the patronage and life-long friendship of Jonas Collin, the manager. Later, King Frederick VI., becoming interested in the strange lad, had him educated at the grammar school at Slagelse. In 1830 he pub. his first vol. of poems, including the widely trans. *Dying Child*. This was followed by a literary satire called *A Walk to Amak*. Adverse criticism met him, but he eventually triumphed after travelling abroad, again at the king's expense. His works, the best of which are proverbially known as *Hans*

*Andersen's Fairy Tales*, include: *Picture-books without Pictures*, *A Poet's Bazaar*, *Tales from Jutland*, *The Wild Swan*, and *The Ice Maiden*. His *Ugly Duckling* and *The Brave Tin Soldier* are known and loved by children the world over. See S. Toksvig, *The Life of Hans Christian Andersen*, 1940; C. B. Burnett, *The Shoemaker's Son*, 1943.

**Anderson**: 1. Co. seat of Madison co., Indiana, U.S.A. Manufs. glass, crockery, and tiles. Pop. 41,000. 2. Co. seat of A. co., S. Carolina, U.S.A., 100 m. N.W. of Columbia; has cotton-seed oil mills, lumber and flour mills, and machine shops. Pop. 19,000.

**Anderson, Alexander** (1845-1909), a Scottish poet. His productions include: *Songs of Labour*, *Two Angels*, *Songs of the Rail*, *Hallads and Sonnets*.

**Anderson, Sir Edmund** (1530-1605), an Eng. lawyer. He was appointed serjeant-at-law to Queen Elizabeth in 1579, and was the author of *Reports of Many Principal Cases Argued and Adjudged in the Time of Queen Elizabeth in the Common Bench*.

**Anderson, Elizabeth** (Garrett) (1836-1917), doctor of medicine. She was the pioneer of the movement to include women in the medical profession. After a severe struggle she at last was admitted to the Society of Apothecaries, London. In 1866 she was appointed general medical attendant at St. Mary's Dispensary, an institution for women medical students. It became the New Hospital later; she officiated there 20 years. She obtained her degree of M.D. from the univ. of Paris, 1870. In London she took part in public life, working on the school board. She married in 1871 Mr. J. G. S. Anderson, a ship-owner, who d. in 1907. In 1908 she was elected mayor of Aldeburgh, her native tn., being the first woman mayor ever elected in England. See Naomi Mitchison, *Revaluations*, 1931.

**Anderson, James** (1662-1728), a Scottish genealogist and antiquary, b. at Edinburgh; he worked during his life upon the publication of *Records of Scottish Parliaments* just before the union. Pecuniary losses resulted and he was appointed postmaster-general as a recompense. His other works include *An Historical Essay showing that the Crown and Kingdom of Scotland is Imperial and Independent*, 1705.

**Anderson, John** (1726-96), Scottish natural philosopher, b. in Dumbarton-shire. He founded A. College, Glasgow. In 1756 he became prof. of oriental languages in Glasgow Univ., and 4 years later prof. of natural philosophy. He was interested chiefly in the application of science to industry. He d. in Glasgow. Produced *Institutes of Physics*, which went through 5 eds. in 10 years.

**Anderson, Karl Johan** (1827-67), Swedish explorer, made sev. important expeditions in S. Africa, which he described in *Lake Ngami, or Discoveries in S. Africa*, 1856; *The Okavango River*, 1861; and *Notes of Travel in S. Africa*, 1875.

**Anderson, Mary** (1859-1942), an Amer. actress of great beauty, b. in California. Her father was an officer in the Confederate service during the Civil War. He d. in 1863. His daughter was educated at Rom. Catholic institutions till she was 13, when she studied for the stage upon the advice of Charlotte Cushman. Her first appearance was at Louisville, in Kentucky, in the part of Juliet, in which she was a great success. In 1889 she retired and married Antonio de Navarro.

**Anderson, Robert** (1770-1833), Cumberland poet, was a native of Carlisle. His first vol. of poems was pub. in 1798, and was followed in 1801 by the popular ballad *Nelly Brown*. His best-known work, the collection of ballads in the Cumberland dialect, appeared 4 years later. Amongst the best of his dialect poems are: *The Impatient Lass*, *King Roger*, *Will and Kale*, *The Bashful Wooer*, and *Jenny's Complaint*. Towards the end of his life A. gave way to intemperance and suffered great poverty. His *Works* were pub. at Carlisle in 1820. See also Gilpin's *Songs and Ballads of Cumberland*, 1874.

**Anderson, Sir Robert** (1811-1921), criminologist and writer, was b. at Dublin and educated at Trinity College. In 1868 he was appointed Home Office adviser in matters relating to political crime, and later became assistant commissioner of police of the metropolis. He was head of the Criminal Investigation Dept. from 1888 to 1901. In 1910 he caused a sensation by confessing the authorship of the famous *Times* letters of 1887 entitled 'Parnellism and Crime.' He is well known for his writings in defence of orthodox religion, among which may be mentioned: *The Bible and Modern Criticism*, 1902; *In Defence; a Plea for the Faith*, 1907; and *The Bible or the Church?* 1908. He was also the author of *Sidelights on the Home Rule Movement*, 1906; *Criminals and Crime*, 1907; and *The Lighter Side of my Official Life*, 1910.

**Anderson, Sir Robert Rowand** (1834-1921), Scottish architect, b. at Forres, and educated at Edinburgh. Trained as a draughtsman in the R.E. Designed the Edinburgh Medical Schools in 1875. His other notable works were the Edinburgh Conservative Club, 1883; Edinburgh Univ. dome, 1886; and the Scottish National Portrait Gallery, 1888. Also restored Dunblane Cathedral, Paisley Abbey, Culross Abbey, and other eccles. buildings.

**Anderson, Sherwood** (1876-1941), Amer. author, b. at Camden, Ohio, education was scanty. His first novel, *Windy McPherson's Son*, was pub. in 1916. With marked psychological insight he portrays life in the Middle W. Novels and short stories include *Marching Men* (1917), *Winesburg, Ohio* (1919), *Poor White* (1920), *Many Marriages* (1922), *Horses and Men* (1923), *Dark Laughter* (1925); also verse, *Mid-American Chants* (1918); and mainly autobiographical, *Tar: a Mid-West Childhood*, 1926; *Sherwood*

*Anderson's Notebook*, 1926, and *A New Testament*, 1927.

**Andersonian Institution**, see **ANDERSON'S COLLEGE**.

**Anderson's College**, Glasgow, was founded by John A., 1795, and endowed by him with a library, museum, and philosophical apparatus. The object of the founder was to give instructions, free of expense, in natural philosophy, Geography, mathematics, Lat., Gk., Heb., and Fr. were afterwards taught, but it is now chiefly engaged in the teaching of medicine, physics, chem., and botany. In 1886 the non-medical sections were incorporated with other institutions as the Glasgow and W. of Scotland Technical College. The medical sections are now known as the A. College of Medicine.

**Andersonville**, a vil. of Sumter, Georgia, noted as having been the seat of a Confederate States military prison, where Union prisoners were confined during the Civil war. This prison was kept in so scandalous a condition that those incarcerated in it d. by thousands. Pop. 300.

**Andes**, a great mt. system in one long continuous chain lying along the W. coast of S. America. Its length is approximately 4100 m., and it extends from the Isthmus of Panama to Cape Horn. The width of the system varies considerably, but its widest point has a breadth of 100 m. Necessarily the altitude is not easily given, but roughly the average height of the chain is 13,000 ft. It is the greatest mt. system in the world. A theory that gains in evidence as time progresses is that the A. are connected with the Rocky Mts. of N. America. The whole system may be divided into 2 almost parallel chains separated by a declivity in which lesser mt. ranges rise. In different localities the names undergo changes. Generally, however, the E. range is known as the A., but in Peru, Colombia, and Bolivia it is called Cordillera Real de los Andes. In Argentina the E. system merges into the W. div., and both ranges now bear together the name of Cordillera de la Costa. The W. section, in Colombia, Peru, and Bolivia, is called La Cordillera, while below lat. 23° S. it becomes the Cordillera de los Andes. The southernmost extremity is Cape Horn, and here the range extends into the sea and actually forms is, bearing the name of Diego Ramuz. The great Chonos Archipelago owes its formation to a similar cause, and many authorities aver that it is the is. that constitute the prin. part of the range. In Patagonia the system is interrupted to some considerable degree by glaciers and deeply cut floods. The highest peaks are Toluca (18,300 ft.), in Colombia; Cayambo (19,155 ft.), Antisana (19,336 ft.), Cotopaxi (19,600 ft.), and Chimborazo (20,500 ft.), in Ecuador. Knot of Pasco and Misti, in Peru; Illimpu (21,500 ft.), Illimant (21,221 ft.), and Sabana (21,000 ft.), in Bolivia; Llullallaco (20,243 ft.) and Coplao (19,685

ft.), to the S. of Atacama Desert; Aconcagua (23,000 ft.), the highest peak in the whole range; and Cima de Mercedario, in Chile.

The whole region is volcanic and possesses many active volcanoes, the chief of which is Cotopaxi, in Ecuador, the flames from the crater of Cotopaxi attaining the extraordinary height sometimes of over 3000 ft. above the crater. Of course the ages of the different portions vary, but the main characteristic of their composition is the volcanic element. In tracing the world's 'ring' of volcanoes, the A. form a link of special significance owing to the abundance of volcanic results and present-day activity. In Tierra del Fuego the Cordillera is composed of crystalline schists, the extremity of which portion are Mts. Darwin and Sarmiento. The A. abound in plateaux, as may well be expected, the most important regarding elevation of which are Assuay (14,500 ft.), Colloa (12,500 ft.), Cruz Verde (11,695 ft.), Pasco (11,000 ft.), Quito (9500 ft.), and Bogotá (8958 ft.). The mineral wealth of the A. is fabulous, and the chief metals for which it is famous are gold, silver, platinum, mercury, copper, lead, tin, and iron. Of gold and silver particularly, the A. hold vast stores. The climate in the Andean region is rendered very dry by the effect of the mts. in cutting off the rain-bearing winds. From the A. eastwards, however, a heavy and beneficial rainy season owes its fall to the position of the A., as they lie directly across the trade winds. The great water-courses of the Amazon, Orinoco, and Plata owe their birth to the E. terraces of the A. The tremendous scale upon which all phenomena are created in this vast mt. system forms one of the chief attractions to visitors and tourists, who never fail to be impressed by the hugeness of their masses and the immensity of the cañons. E. Whymper, *Travels Amongst the Great Andes of the Equator*, 1892; E. A. Fitzgerald, *The Highest Andes*, 1899; L. Gallois, *Les Andes de Patagonie*, 1901; Lord Conway, *The Bolivian Andes*, 1902; P. Krüger, *Die paläontologischen Andes zwischen dem 42 und 44 Grade südlicher Breite*, 1909; A. G. Veatch, *Quito to Bogotá*, 1917; I. Bowman, *Desert Trails of Atacama*, 1924; A. Quicker (ed.), *Adventure and Exploration in South America*, 1930; A. M. Renwick, *Wanderings in the Peruvian Andes*, 1939.

**Andesite**, a name given originally to a group of lavas found in the Andes, but now applied to a large number of igneous rocks found in volcanic areas throughout the world and belonging to all geological epochs. They show considerable differences in composition, but usually consist of a ground-mass of felspar crystals, in which other minerals, such as biotite, hornblende, augite, and hypersthene often occur. They are common in the Andes and Cordilleras of S., Central, and N. America. *Andira*, a genus of tropical Leguminosae. *A. inermis*, the cabbage tree,

is a species found in the W. Indies; its bark is a strong anthelmintic.

**Andizhan**: 1. A region of the Uzbek, S.S.R. Area 2800 sq. m. Very fertile, growing cereals, fruit, etc. 2. Cap. of the region of A., on l. b. of Upper Syr-Darya R. Terminus of Trans-Caspian railway. Has cotton factories. Pop. 83,000.

**Andkhui**, a tn. in Afghanistan, due N. of Balkh, on the edge of the desert. Its site is extremely unhealthy, and the pop. consists mainly of Turkomans, Uzbeks, and a few Tajiks. Pop. 15,000.

**Andocides** (439-389 B.C.), one of the celebrated Attic orators. He was concerned in the mutilation of the Hermæ in 415, but in order to save himself he turned informer, in spite of which he had to forfeit many civil rights, and was condemned to exile. Banished from his native land, he followed a commercial occupation. On the democratic restoration he returned to Athens, and, recovering favour, was appointed to sev. high places. In 391 he was sent as an ambas. to Sparta to negotiate for peace. His failure led to complete downfall. He is said to have been banished and to have died in exile. Three of his speeches are extant.

**Andorra**, a small republican state on the Franco-Sp. border. It forms one large valley, being entirely surrounded by mts., a physical circumstance which has made independence easy to maintain and communication with the outside world difficult of establishment. The climate is cold and the winters are severe. Most of the land is used for the purposes of pasturage, with the exception of the S., whose fertile slopes afford scope for cultivation. The chief products are grain, fruit, potatoes, tobacco, dairy produce and wool. The surrounding mts. contain quantities of iron and lead, but the industries that might develop are hampered by a lack of fuel. Nor has the country any financial capital. In religion all the Andorrans are Rom. Catholics. The region comprises the 6 dists. of A.-Vicilla, Canillo, Encamp, La Massana, Ordino, and San Julian de Loria. A. is governed by a council-general of 24 members elected for 4 years; half of the council is re-elected every 2 years. The cap. of the state is A.-Vicilla. A. traces its independence back to Charlemagne. At the present day A. is under the joint suzerainty of France and the Sp. bishop of Urgel. Each appoints a 'vicar', i.e. a judge. A permanent official represents Fr. interests. The franchise was enlarged after a bloodless revolution in Apr. 1933. The language of A. is Catalan. The General Council of A. in 1934 decreed that the country should thenceforth be known only by its true title, Las Valls d'A. instead of La Republica d'A. the cap. has a pop. of about 700. The general character of the Andorrans is good-natured and moral. Area 191 sq. m. Pop. 5000. See L. G. Leary, *The Hidden Republic*, 1912; V. W. Johnson, *Two Quaint Republics, Andorra and San Marino*, 1913; B. Newman,

*Round about Andorra, 1928*; R. Moreno, Andorra, 1931.

**Andover**, a mkt. tn. of Hampshire, England. It is situated on the R. Anton, a trib. of the Test. The centre of an extensive agric. dist., it owes its importance to its agric. products. It contains many very well-preserved Rom. remains. Its former industries of silk, iron, and parchment are now extinct. Pop. 9700.

**Andover**, a tn. of Essex co. in Massachusetts, U.S.A., on the S.E. side of Merrimac Valley, the most important centre in the world for mills. It is noted for the manuf. of twine, woollens, and rubber goods, and for its educational institutions, Phillips Academy, Abbot Academy, and the Theological Seminary. Harriet Beecher Stowe resided, and is buried, at A. Pop. 11,000.

**Andrade e Silva, Bonifacio José de** (1763-1838), Brazilian scientist, author, and statesman, and one of the founders of Brazilian independence. Studied in Europe, and subsequently, in virtue of his distinguished scientific attainments, was appointed prof. of geology and metallurgy at the univ. of Coimbra, Portugal. He returned to Brazil in 1819, took up the cause of independence, and in 1822 became minister of the interior under Dom Pedro I. He was banished in 1823 on account of his democratic opinions, but on the abdication of Dom Pedro was entrusted with the education of the prince imperial. In addition to important scientific memoirs he wrote *Poesias d'America Elysea*, Bordeaux, 1825.

**Andrássy, Count Julius** (1823-90), Hungarian statesman, b. in Kassa in Hungary. He plunged early into political controversy. In 1846 his bitter writings attracted notice. In 1848 he was returned as a Radical member of the Diet. In the Hungarian revolt he took part, and an effigy of him was hanged in Austria. In 1867 he was made the first Hungarian premier, and later succeeded Beust as chancellor. Here he advanced radical changes, and under his influence Austria resumed her position of prominence in Europe. His policy of occupying Bosnia and Herzegovina was very unpopular, and he was compelled to retire from the public arena.

**Andrássy, Count Julius** (1862-1929), Hungarian statesman, son of the above. For a long time a leading member of the Hungarian Diet and the pillar of the old Liberal party, together with Count Apponyi. During the difficult times of 1917 he succeeded Count Tisza as a Magyar obstructionist to constitutional reforms (see AUSTRIA-HUNGARY). In Oct. 1918 he succeeded Count Burian as foreign minister, being the last foreign minister under the Dual Monarchy. In that capacity he notified President Wilson that his Gov. was ready to acknowledge 'the rights of the peoples of Austria-Hungary, especially those of the Czechoslovaks and the Yugoslavs,' and to make a separate peace without awaiting the issue as between Germany and the

Allies. His *Bismarck and Andrassy* is a commentary on the Hapsburgs and the causes of the collapse of that monarchy.

**André, or Andreas, Bernard** (c. 1500), historian and poet, was a native of Toulouse, and an Augustinian friar. He is supposed to have come to England with Henry VII., who made him poet laureate and royal historiographer. He secured various eccles. appointments and became tutor to Arthur, prince of Wales. He wrote in Lat. a valuable hist. of Henry's reign, under the title *Historia Regis Henrici Septimi*.

**André, John** (1751-82), b. in London, was adjutant-general to the Eng. forces during the Amer. war of Independence. He was appointed in 1780 to carry on negotiations with the Amer. general, Arnold (q.v.), who offered to betray his command at West Point. Maj. A., when returning from an interview in disguise, was captured by the rebels and sent to Gen. Washington, who after a trial had him hanged at Tappan as a spy. His remains were brought to England in 1821, and a monument is erected to his memory in Westminster Abbey.

**Andrea del Sarto** (1488-1530), a Florentine painter. He was the son of a tailor, hence his surname ('of the tailor'), and most of his early training was obtained by studying the works of such great masters as Michelangelo and Leonardo da Vinci and the engravings of Dürer. In 1518 he went to France at the inducement of Francis I., but was guilty, through the extravagance of his wife, of appropriating certain sums entrusted to him by his royal patron for the purchase of works of art. His chief pictures include 'The Sacrifice of Abraham,' 'A Burial,' 'The Dead Saviour with Mary and the Saints,' 'The History of Joseph,' 'The Madonna del Sacco,' and sev. holy families. He also copied sev. of the old masters, attaining in this style of work a very high standard. It is said that at the taking of Florence in 1529 the soldiers were so awestruck by his picture of 'The Last Supper' that they left the house without committing any violence. He d. of plague. Browning wrote a poem, *Andrea del Sarto*, in his *Men and Women*.

**Andrea Vanucci**, see ANDREA DEL SARTO.

**Andreas. Laurentius** (1480-1552), Swedish pioneer of Protestantism, studied at Rome, but returned with Protestant convictions, and as archdeacon of his native place, Strängnäs, brought Gustavus I. over to the side of the reformed religion. The king appointed him to superintend the translation of the Bible. He subsequently fell into disgrace, and was sentenced to death for conspiracy, but was ultimately reprieved with a heavy fine.

**Andreas**, an A.-S. poem, in which are described the adventures of St. Andrew in rescuing St. Matthew from prison in Mermedonia. It has been attributed to Cynewulf. Some of the sea passages, such as the description of the stormy voyage, are particularly fine.

**Andreasberg**, a tn. in Hanover, Germany, 14 m. from Clausthal-Zellerfeld, noted for its mines, yielding silver, lead, copper, iron, cobalt, and arsenic. Pop. 3700.

**Andrée, Saloman August** (1854-97), a Swedish engineer and explorer. In July 1897 he attempted to reach the N. Pole by balloon with 2 companions, Strindberg and Fraenkel. This hazardous journey was attempted in the days before the introduction of aircraft of any sort other than the drifting balloon, and before the advent of radio-telegraphy. A's balloon was one of 5000 cub. metres capacity, and a start was made from Dane's Is., Spitsbergen, on July 11. A's only means of communication with the outer world was by buoys dropped overboard and by carrier-pigeons. Sev. of the former were subsequently found, and a pigeon bearing a dispatch dated July 13 returned home. Thereafter nothing further was known of the intrepid party until the summer of 1930. In that year 2 Norwegian vessels engaged in scientific survey work came upon the bodies of the explorers on White Is., between Spitsbergen and Franz Josef Land. This discovery was only rendered possible by an exceptional melting of the snow and ice covering A's last camp. Among the finds were logs and diaries which showed that the balloon had remained in the air for 3 days and that death had overtaken the party, after travelling on foot over the ice, or drifting on the floes, in Oct. 1897. The bodies were brought home to Sweden, with the impedimenta of the expedition, and the contents of the diaries and logs pub. According to these the ice fringe was reached on the first day, the drift being at first northerly and N.W., then easterly. 82° N. was reached at about midnight of the first day. The balloon then remained stationary for some hrs., then moved westerly and then S. The balloon finally landed at 83° 4' N. lat., and was abandoned. The death of the party, after a passage over the ice to a spot many scores of m. to the S., was not due to hunger, for food was found next the bodies.

**Andrew**, the name of 3 Hungarian kings. A. I. reigned 1046-58, and was dethroned by his brother. A. II. reigned 1205-36, and in 1217 conducted a crusade to Jerusalem; while A. III. came to the throne in 1290, and reigned till 1301, after opposition from the pope, who wanted to keep the country in his own power, but the king defeated the army of the Church and held the crown.

**Andrew, Saint**, was the brother of St. Peter and the first disciple of Jesus. Both brothers were fishermen. St. A. preached in Scythia, Thrace, Asia Minor, and in Greece, and tradition tells us that he was crucified at Petre on an X-like form of cross known as St. A.'s Cross. The Russians revere him as having brought them the gospel, and he is the patron saint of Scotland, and the sup-

posed anniversary of his martyrdom, Nov. 30, is honoured with a feast.

*The Order of St. A.* was the highest honour in Russia, and was founded in 1698 by Peter the Great. With a few exceptions, it was only given to those of royal blood. St. A.'s Cross was the emblem on the Russian naval flag, and it forms part of the Brit. Union Jack, where it represents Scotland, being taken from the old Scottish flag.

**Andrewes, Lancelot** (1555-1626), a famous Anglican bishop, who was b. in London. He was educated at Pembroke Hall, Cambridge, and in 1589 was made a canon of St. Paul's and master of Pembroke Hall. He was chaplain-in-ordinary to Queen Elizabeth and in favour also with James I. He was made bishop of Chichester in 1605, and translated to Ely in 1609, and made a privy councillor. He helped with the preparation of the A.V. of the Bible. He was the most learned of all Eng. theologians. In 1618 he was made bishop of Winchester, and d. in 1626. One of Milton's early Lat. elegies bewailed the death of A. His best-known work is his *Manual of Private Devotions and Meditations for every Day in the Week*.

**Andrews, Charles McLean** (1863-1943). Amer. historian and educationist, b. at Weathersfield, Connecticut. Educated at Trinity College, Hartford, and Johns Hopkins Univ. Appointed Farman prof. of Amer. hist. at Yale. A distinguished scholar, A. is known to Eng. research workers by his 'Guides' to the materials for Amer. hist. up to the year 1763. The following are among his chief publications: *River Towns of Connecticut*, 1889; *Contemporary Europe, Asia and Africa*, 1874-1901, 1902; *The Colonial Period of American History*, 1912; *Fathers of New England and Colonial Folkways* in 'Chronicles of America' series, 1919; and *The Colonial Background of the American Revolution*, 1921.

**Andrews, Elisha Benjamin** (1841-1917). Amer. economist, historian, and educationist, served in the Civil war, in which he lost an eye. He was president of Denison Univ. 1875-79, prof. of homiletics at Newton Theological Institution 1879-82, a prof. of political economy at Brown Univ. 1882-88, and president of the same univ. 1889-93. From 1900 he was chancellor of Nebraska Univ. At the Brussels Monetary Conference of 1892, to which he was U.S. delegate, he ardently championed the cause of international bimetalism. Amongst other works he wrote *Institutes of Economics*, 1889; *An Honest Dollar*, 1889; *Wealth and Moral Law*, 1894; *History of the United States*, 1894; *History of the Last Quarter Century in the United States*, 1898; and *The United States in our own Times*, 1904. D. at Interlaken, Florida.

**Andrews, James Pettit** (1737-97), historian and antiquary, was b. near Newbury. After serving in the Berkshire militia, he studied law, and subsequently became a magistrate at the



Queen Square police court, Westminster. His chief works are: *Anecdotes, Antient and Modern*, 1789; *History of Great Britain connected with the Chronology of Europe*, 1794-95; and *History of Great Britain from Death of Henry VIII. to Accession of James VI. of Scotland*, 1796. This last was a continuation of Henry's *History of Great Britain*.

**Andrews, Roy Chapman.** Born Beloit, Illinois, Jan. 26, 1884. Eminent as a zoologist and chief of the div. of Asiatic exploration for the Amer. Museum of Natural Hist. Has discovered oldest known mammals and extensive evidence of primitive human life in the Central Asiatic plateau. Discovered many geological strata previously unknown, including some of the richest fossil fields. He was the first to discover fossilised dinosaur eggs, and skull and parts of the skeleton of the baluchitherium, the largest known mammal. Has proved Central Asia to be one of the chief centres of the origin and distribution of reptilian and mammalian life. Member of many Amer. scientific societies and corresponding member Zoological Society and Central Asiatic Society of London.

**Andrews, Saint,** see SAINT ANDREWS.

**Andrews, Thomas** (1813-83), chemist and physicist, was a native of Belfast, where, after practising medicine for some years, in 1845 he became prof. of chem. at Queen's College. His most important scientific achievement was the discovery of the continuity of the liquid and gaseous states. His scientific papers, with a memoir, were ed. by Tait and Crum Brown, 1889.

**Andreyev, Leonid Nikolaevich** (1871-1919), a Russian novelist and dramatist, b. Orel, of a family of the provincial intelligentsia. The poverty and misery in his life are reflected in the gloominess of his stories. He was the only writer of his generation to rival Maxim Gorky in popularity. He excelled chiefly in short stories, the style of which is Tolstoyan realism, but with something of the lighter touch of Tchekov. A. is as terrible as Gorky, but an essential difference may perhaps be that where Gorky describes life, as he has seen it, as though it were life seen whole, A. seems rather to select abnormalities while recognising them as such. Among his best-known short stories are *The Abyss* and *In the Fog*. His earlier tales are sex problems treated in a bold, crude manner; the later are more artificial and told in a somewhat turgid, declamatory style. His plays, which are symbolical in treatment, e.g. *The Life of Man* (1906), are marred by the crudities of melodrama.

**Andria,** a tn. in the S. It. prov. of Bari, and 30 m. N. of that tn. It has a fine cathedral founded in 1046. Majolica manuf. is carried on, and a trade in almonds. Pop. 51,000.

**Andrieux, François Guillaume Jean Stanislaus** (1759-1833), a Fr. author b. in Germany. At first he was a lawyer, but forsook that calling for literature.

His comedies are distinguished by their wit and charm, among the best being *les Etourdis* and *La Comédienne*. He also wrote many poems and romances. He was secretary of the Fr. Academy.

**Androcles, or Androclous,** was the Rom. slave who, when hiding from his master in the desert, extracted a thorn out of the foot of a lion. When he was caught he was taken to the circus as a punishment, and a lion was let loose upon him. To the astonishment of the people the animal fawned on him instead of devouring him, for it was the identical animal he had succoured in the desert. He afterwards led the lion through the streets of Rome. This story was told by Apion (q.v.), and is to be found in Gellius, v. 11.

**Androgynous** (Gk. *ἀνδρ.* man, *γυνή*, woman), a biological term synonymous with hermaphrodite. It implies in zoology that the animal, such as a leech, possesses in its one body the organs of both sexes; and in botany that the plant, such as the arum lily, has both male and female flowers on one inflorescence.

**Andromache** was the daughter of Eetion, king of Thebes in Cilicia, and wife of Hector, one of the finest female characters in the *Iliad*. After the conquest of Troy captured by Pyrrhus (Neoptolemus), son of Achilles, by whom she had 3 sons, but Pyrrhus afterwards left her to Helenus, the brother of Hector. She is made the chief character in tragedies by Euripides and Racine.

**Andromeda** was the daughter of the Ethiopian king Cepheus and of Cassiopeia. Because of the mother's boast of her daughter's beauty surpassing that of certain goddesses, Neptune, their father, sent a terrible sea-monster to invade the kingdom of Cepheus. To appease Neptune the oracle declared that A. must be given up to the monster. From this danger she was rescued by Perseus, who beheld her chained to the rock; he slew the monster and obtained the beautiful virgin in marriage. This story forms one of Corneille's tragedies, and has given the name to a constellation.

**Andromeda,** a constellation situated in a region of the heavens below Cassiopeia. It is to be found by drawing a line through the brightest star (βeta of the five in Cassiopeia ('My Lady') Chair') and the Pole star. This passes through a star of the first magnitude in the head of A., marked α, and called Alpheretz. Perseus is a neighbouring constellation. A. is a constellation rich in astronomical interest, and includes a remarkable nebula, a triple star, and the radiant point of a meteoric shower. The nebula is remarkable in that it is the only nebula visible to the naked eye. It was first observed through a telescope by Simon Marius on Dec. 15, 1612, who compared it to a candle shining through a horn lantern, but there seems evidence that this nebula was discovered by Al Sufi in the tenth century. Whether this be so or not, the nebula in A. is memorable for being the first discovered nebula, its

great rival in Orion not being discovered till 40 years later. It is spiral in shape, a fact first disclosed by a photograph by Dr. Roberts in 1888. The Andromedids, a shower of meteorites radiating from a point in A. on Nov. 28, have been conjectured to be the fragments of the disrupted, short-period, Biela's comet. Almaach, or Gamma Andromedæ, was found by Herschel to consist of 2 stars of magnitude 2.5 and 5.5, about 10' distant. On examining the fainter of the 2 stars by a very powerful telescope Otto Struve found it to be a very close double star. Subsequent discovery revealed the fact that this pair, green and blue in colour, revolve round the primary, which is an orange-coloured or solar star.

**Andromeda**, a genus of plants belonging to the Ericaceæ. They are shrubs, natives of Europe, Asia, and N. America. *A. polifolia*, wild rosemary, grows in Brit. peat bogs; *A. rosmarinifolia*, rosemary-leaved marsh A., is found in Newfoundland and Labrador.

**Andronicus** was the advocate of the Jews under the reign of Ptolemæus Philometor against the Samaritans in Egypt, who asserted the authority of the temple on Mt. Gerizim against the temple at Jerusalem. Ptolemæus Philometor was appealed to, and in court Sabbal (Sabbæus) and Theodosius, the Samaritan advocates, lost their cause against A., and were put to death.

**Andronicus** (c. 1100), the first Comnenus, an emperor of Byzantium. He killed Alexius II. and seized the throne, but in 1185 he was himself assassinated.

**Andronicus Cyrrhestes** (c. 100 B.C.), a Gk. architect, who was famous for having constructed the Tower of the Winds at Athens. It takes its name from the figures of the 8 winds being cut in relief on the exterior wall of the building. The tower was intended for a sun-dial, and it also contained a water-clock.

**Andronicus, Livius**, the earliest Rom. poet, was really a Gk., and formerly a slave to M. Livius Salinator, who freed him and gave him the name of Livius. He wrote both tragedies and comedies, and his first drama was acted in 240 B.C. He also trans. Homer's *Odyssey* into Saturnian verse.

**Andronicus Palæologus**, the elder and the younger, emperors of Byzantium, the former reigned from 1283 to 1328 and the younger 1328-41. Both reigns were noted for the wars with the Turks, who, in the latter, conquered all the Asiatic ter. of the empire.

**Andronicus Rhodius** (c. 58 B.C.), a Rom. philosopher. He is chiefly known through his exposition of the teachings of Aristotle.

**Androphagi**, a race of cannibals, mentioned by Herodotus as inhabiting a region adjacent to Scythia. Later, the term is used for cannibals generally.

**Andropogon** is a genus of Gramineæ of which sev. species are well known. *A. schæmanthus*, the Indian rusa grass,

yields the aromatic rusa oil, *A. nardus* citronella oil, and *A. Sorghum* a kind of millet seed from which a flour, called durra in India and Arabia, is made.

**Andros**, an is. of the Grecian Archipelago, situated to the S.E. of Eubœa. It is 21 m. long, 8 m. broad. It is mountainous, and the soil is fertile, producing grapes, oranges, citrons, and lemons. The manufs. consist of wine and silk. The most important tn. is A., or Castro, situated on the E. coast. Pop. of is. 17,000.

**Andros Island**, one of the Bahamas group, has a length of 100 m., and varies in breadth from 10 to 40 m. It is low and swampy, but well timbered, and exports sponges and wool. Pop. 7000.

**Andros**, Sir Edmund (1637-1714). From 1671 to 1681 he was governor of New York, and afterwards of New England. In 1689 the colonists deposed and arrested him and he was sent to England to be tried for attempting to seize the charter of Connecticut, but acquitted and appointed governor of Virginia in 1692. This post he held for 6 years.

**Androscoggin**, a riv. of Maine, in America, which rises in the White Mts. and which subsequently joins the Kennebec after a course of 155 m.

**Androsphinx**, a sphinx with the head of a man, not of a woman as is usually the case. An example is the A. of Thothmes III. in the Boulak Museum, Cairo.

**Andújar**, a Sp. tn. in the dist. of Andalusia in the prov. of Jaén, situated on the R. Guadalquivir. The chief manuf. carried on is of porous cooling water-jars. In 1808 the convention of Baylen was signed here. Pop. 22,000.

**Anduze**, a tn. in Gard, France, on the Gardon d'Anduz. It is an ill-built place, but is situated amongst beautiful scenery, and is noted for its basket and paper making, and for its potteries. Pop. 2500.

**Anecdote** (Gk. ἀνέκδοτος, not published) is a narrative of a particular fact or incident often little known, but nevertheless interesting, and affording a side-light on the true character of a person, or of the characteristics of a certain age. Formerly the term was applied to private or hitherto unpub. memoirs or narratives. Muratori and Merseune gave the name of *anecdota* to unknown works which they ed. Procopius wrote an anecdotal hist. of the Emperor Justinian and his wife Theodora, and As. were common among the Gk. and Lat. writers.

**Anegada**, see ANTILLES.

**Anelron**, see ANEURIN.

**Anelectrotonus**, the decreased excitability in the neighbourhood of the anode in a nerve through which an electric current is passing. The part of the nerve near the positive pole needs a stronger stimulus than under normal conditions to display functional activity, whilst near the negative pole the excitability of the nerve is increased. The latter condition is called *catelectrotonus*.

**Anemochord**, a kind of pianoforte

invented by Schnell in 1789, in which the notes were produced by currents of compressed air directed on the strings. On this instrument the music had a peculiar effect of distance.

**Anemometer**, an instrument for measuring the velocity of the wind. In the Robinson or cup A. 4 hemispherical cups are fixed on 4 arms at right angles so that their concave surfaces are in the same direction of rotation. The motion imparted by the wind is trans. by a series of cog-wheels so as to indicate m.p.h.

The Dines or tube A. consists of 2 tubes, one of which has an open mouth kept facing the wind by a vane as in a weathercock. The increased pressure is communicated down the tube to a recording apparatus. The other tube is perforated by small holes arranged in rings so that suction, or a decrease in pressure, is produced by the wind passing across the holes. The decrease in pressure is also communicated to the recording apparatus, which consists of a float in a closed vessel, so arranged that when the wind is blowing the increased pressure in the first tube is applied underneath the float, raising it in the water, and the decreased pressure is communicated to the air above the float, also tending to raise it. The movements of the float are registered graphically on a slowly revolving drum.



SEA ANEMONE, CLOSED AND EXPANDED

**Anemone**, a genus of Ranunculaceæ, includes sev. well-known and beautiful flowers which possess the property of extreme acidity. *A. pulsatilla*, the Pasque flower, and *A. pratensis* are powerful emetics; the leaves of the former will raise blisters on the skin. *A. nemorosa* is the wood-anemone or 'wind-star,' *A. Hepatica*, the hepatica, and *A. coronaria* the common garden anemone.

**Anemone, Petrified**, see CHAONITES.

**Anemone, Sea**, is a name given to the polyps which do not form coral, the Actinaria, of the order Zoantharia, because their spread-out tentacles give

them a resemblance of the flower A. They are found attached to rocks and the shells of hermit crabs; a few can swim freely; they feed on small animal life.

**Anemoscope**, an instrument for determining the direction of the wind. It is usually constructed by connecting with the spindle of a weathercock the hand of a dial on which the points of the compass are marked. The electrical A. of A. Lucchesi, by means of a galvanometer, gives the 8 prin. directions of the wind.

**Anerley**, a London suburb, 7½ m. S. of London Bridge by rail.

**Aneroid**, a term applied to a barometer in which the pressure of the air is measured without the use of mercury or other liquid. It consists essentially of a hollow box of elastic metal in which there is rarefied air. Any external pressure causes a proportionate amount of compression of this box, which is conveyed through a multiplying arrangement to the pointer on the dial. A preliminary graduation in comparison with a good mercury barometer enables the atmospheric pressure to be shown.

**Anethum**, a genus of Umbelliferae, now included in *Peucedanum*, is the dill. *A.* (or *P.*) *graveolens*, the common dill, native of S. Europe, Astrakhan, Egypt, and the Cape of Good Hope, was mentioned by Hippocrates and Dioscorides as a medicinal and savoury herb. The fruit is used as a condiment.

**Aneurin**, or **Aneiron** (fl. c. 603), a Welsh poet, supposed to be the son of Caw ab Geraint, a Welsh chieftain. According to another account he is said to be the same as the historian Gildas. He was educated at St. Cadoc's College at Llanancarvan. His chief poem, *Gododin*, tells of the victory of the Saxons over the Britons at Cattraeth, at which A. was present. He is supposed to have been assassinated by Eldyn ab Einygan. *Gododin* was trans. into Eng. in 1809 by Edward Davies.

**Aneurysm**, or **Aneurism**, a circumscribed dilatation of an artery formed of one or more of its coats. In a *false A.* the coats are ruptured; *military As.* are minute *As.* occurring along the course of the blood-vessels of the brain; an *arterio-venous A.* is occasioned by a direct connection between an artery and a vein, the latter becoming pulsing and dilated; *mycotic As.* are caused by collections of bacteria within the arteries.

*As.* may be caused by *arterio-sclerosis*, or the thickening of the arterial coats, the plugging of a vessel by particles of fibrin or by bacterial growths or by any sudden strain or injury. It is found that men in the active period of life are most affected, pointing to the probability of the condition being caused by strain.

Most cases involve the thoracic portion of the aorta. If the *A.* is small it may give rise to no physical signs, but if large, pain is constant owing to the compression of other organs, a prominence like a pulsating tumour may be formed, and pressure upon the windpipe may give rise to a paroxysmal

cough and constant shortness of breath. There is always danger of perforation and a speedy death, but if the condition is recognised and treated, it may pursue its course for a protracted period until the A. ruptures and hemorrhage into the adjacent cavities or organs takes place. Pulmonary complications, such as tuberculosis or fibrinous pneumonia, may be set up, and in any case there is growing weakness. The treatment aims at the coagulation of the blood, and secondly, the contraction of the sac. To secure the first, absolute rest in a recumbent posture is advisable, but if that cannot be enforced, exertion should be reduced to a minimum, and liquid should form as small a proportion of the diet as possible. Contraction of the sac appears to be promoted by the use of potassium iodide.

An A. of the abdominal aorta may press against the vertebrae and erode the bone, when compression of the cord may take place, producing paralysis. If the growth be low down it may be possible to effect a cure by pressure, which must be maintained for at least 24 hrs. under an anæsthetic.

Angara is a Siberian riv. which flows through Lake Baikal and joins the Ir. Yenisei after a course of 1300 m. The principal town on its banks is Irkutsk.

Angary, Right of, in international law, formerly a right claimed by a belligerent, deficient in vessels, to lay an embargo on and seize neutral merchant vessels in their harbours and to compel them and their crews to transport troops and supplies on payment of advance freight. The modern right consists in the right of belligerents to use, or destroy in case of necessity, for the purpose of offence and defence, neutral property on their own or on enemy ter. or on the open sea. (See further under NEUTRALITY.)

Angel, the word *ánġol* is derived from the Gk. *ἄγγελος*, a messenger, which is the translation of the Heb. *mal'akh*; and in both the O.T. and N.T. it represents a spiritual being awaiting God's commands, a messenger, and a means of manifestation of God to man. In the early historical books of the Bible the A. especially represents a manifestation of God Himself. Sometimes it has no form—only a voice is heard, as when the A. of God spoke unto Jacob in a dream (Gen. xxxi. 11); and sometimes there is a form resembling that of a man, as when Abraham was visited by 3 men (Gen. xviii.), when 2 A. came to Lot and did eat unleavened bread with him (Gen. xix.), and when Jacob wrestled with a man until the breaking of the day (Gen. xxxii. 24-30). Later an A. represented a messenger who carried out the commands of the Lord. In 2 Sam. xiv. 18, when the A. stretched out his hand to destroy Jerusalem, the Lord commanded him to stop; and in Exod. xxiii. 20-23 the Lord sent an A. to bring the people of Israel to the place that was prepared for them, telling them that they were to

obey His messenger, for His name is in him. A comparison of the passages Exod. xxxii. 34 and xxxiii. 2 with the passage Isa. lxiii. 9 implies that there was a distinction between the 'A. of the Lord' and the subordinate A. A. have also been called by other names—'sons of God' (Gen. vi. 2), 'sons of the mighty' (Ps. lxxxix. 6), 'saints' (Zech. xiv. 5), and 'holy one' and 'watcher' (Dan. iv. 13). In the passage Ps. ciii. 20 the A. excel in strength, they are God's ministers and hosts that do His pleasure; and in 1 Kings xxii. 19 they are a host of heaven standing on His right hand and on His left. The notion that they are warlike beings is found in Joshua v. 13 (a man with a sword drawn in his hand), and in Ps. lxxviii. 17, when the A. appear in the 20,000 chariots of God. The whole hosts of A. are divided into different sections of which the archangels are the greatest. In Daniel this idea is shown, for Persia and Greece have special A. called princes (Dan. x.). Michael is the prince (Dan. x. 21), and Gabriel is the *angelus interpretis*, the angel interpreter. In the post-canonical books and in the apocalyptic literature the names, ranks, and classes of A. are given. The chief archangels are Michael, Gabriel, and Raphael, who with Uriel, Chamuel, Jophiel, and Zadkiel, stand before God. Israfil, 'the sweet singer,' is generally regarded as the A. of death in the Mussulman mythology. In the book of Enoch, cherubim and seraphim are mentioned as being distinct classes of A., and Raphael and Phanuel are individual archangels. In Job i. 6, Satan is spoken of as one of the sons of God. Evil A. are mentioned in Ps. lxxviii. 49, but they are not evil themselves—they are so called because through them God destroys the vines and flocks of the faithless and visits them with pestilence. The same idea is expressed in Judges ix. 23 and in 2 Kings xix. 35. In the N.T. guardian A. are frequently mentioned who rejoice and grieve with individuals, as in Matt. xviii. 10 and in Luke xv. 7, 10. According to the passages Heb. ii. and 1 Cor. vi. 3, the A. are inferior to Christians; nevertheless, according to Rev. xiv. 16, Heb. i. 14, and 1 Pet. i. 12, the A. take their part in ministering God's word. A host of A. attended Christ on His ascension into heaven, and they will also accompany Him on His second coming to judge the world. A. worship is strictly forbidden by St. Paul (Col. ii. 18). From Eph. i. 21 and Col. i. 16 we learn of the existence of a hierarchy, thrones, dominions, principalities, powers, and might being mentioned. Pseudo-Dionysius of the fifth century in his work entitled *De Hierarchia Celesti* gives a full account of this angelic hierarchy. In the Book of Revelation A. play an important part. There are the A. of the 7 churches of Ephesus, Smyrna, Pergamos, Thyatira, Sardis, Philadelphia, and Laodicea (i. 20, ii. iii.);

an A. seals the servants of God in their foreheads (vii. 3); 7 As. with trumpets stand before God (viii. ix. x.); there was war in heaven when Michael and his As. fought against the dragon (xii.); and 7 As. had golden vials full of the wrath of God (xv.). The Devil and his associates who were expelled from heaven (Milton, *Paradise Lost*) are sometimes called the fallen As.; the Devil also having the name of Lucifer, 'light-bringing,' i.e. the morning star.

Angel was originally a gold coin of France, where it was first coined in 1340. It was introduced into England by Edward IV. 1465, when it was valued at 6s. 8d., and, being of the same value as the noble, was sometimes called the A-noble. Under Henry VIII. its value was raised to 8s. and under Mary to 10s., and it was last coined by Charles I. The device on the obverse of the coin was St. Michael piercing the dragon with a spear, and on the reverse it had a ship, with a large cross for a mast, and the royal arms in front.

Angel-fish, or Monk-fish (*Squatina angelus*) is a shark much resembling the ray. This elasmobranch is the type of the family Rhinidae and order Selachii, and is found round the coasts of N. America and Australia. The blue angels, deep laterally compressed fish with long filaments to their tails and fins, have become the mascot of Bermuda.

Angelica, a plant of the order Umbelliferae of which the candied roots form a sweetmeat. *A. archangelica*, or *Archangelica officinalis*, is cultivated for its aromatic odour.

Angelico, Fra (1387-1455), a famous Florentine painter, who was also a Dominican monk. His full name was 'Il Beato Fra Angelico Giovanni Angelico da Fiesole,' or in Eng. 'the Blessed Brother John the Angelico of Fiesole.' He was b. at Vicchio. The early part of his life was spent at Florence and the latter at Rome, where he was summoned by the pope. He is famous for his frescoes, which are in Rome, Florence, Fiesole, and other It. towns, the most wonderful being the series at San Marco, Florence.

Angélique and Agnès, see under JANSENISM.

Angell, George Thorndike (1823-1909), Amer. philanthropist, b. at Southbridge, Massachusetts, U.S.A. Admitted to the Boston bar in 1851. In 1868 became president of the Massachusetts Society for Prevention of Cruelty to Animals. Became ed. of *Our Dumb Friends*. Initiated the movement for the establishment of the Bands of Mercy. In 1889 founded and became president of the Amer. Humane Education Society. Notable also as a criminologist.

Angell, James Burrill (1829-1916), Amer. educationist, b. in Rhode Is. Educated at Brown Univ. Was prof. of modern languages and then took up journalism. Subsequently became president of the univ. of Michigan, which institution he brought to a high state of efficiency. Later became Amer.

minister to China and then to Turkey. Pub.: *Progress in International Law*, 1875; *Reminiscences*, 1912, and *Selected Addresses*, 1912.

Angell, James Rowland (b. 1869), Amer. psychologist and educationist, b. at Burlington, son of James Burrill A. (q.v.). From 1894 to 1901 he was assistant prof. of psychology at Minnesota Univ., and in 1905 head of the dept. In 1912 he went to the dept. of psychology at Chicago Univ. and, later, became president of Johns Hopkins Univ. Works: *Psychology*, 1904 (new ed. 1908); *Chapters from Modern Psychology*, 1911; *American Education*, 1937.



B.B.C.

SIR NORMAN ANGELL

Angell, Sir Ralph Norman (b. 1874), Eng. author and journalist, son of Thomas Angell Lane of Holbeach. Educated privately and in France. Early years spent in ranching in the U.S.A. and, later, in journalism. In Paris he ed. *Galignani's Messenger* from 1899 to 1903; then joined the staff of the *Eclair* and, from 1905 to 1911, was general manager of the Paris ed. of the *Daily Mail*. Dropped the name of Lane and became world-known as the author of *The Great Illusion* (1910), the theme of which is that war is unprofitable to victors. Labour M.P. for N. Bradford, 1929-31. Knighted 1931. Nobel Peace Prize, 1933. Other works include *The Story of Money*, 1930; *The Unseen Assassins*, 1932; *The Money Mystery*, 1936; *For What do we Fight?* 1939; *Let the People Know*, 1943; *The Sleep Places*, 1947.

**Angeln** is a dist. in Germany between the Baltic and the Schlei. It is said to be the original country of the Angles, who in the fifth century invaded England.

**Angelo Buonarroti the Younger** (1568-1646) was b. at Florence and d. at Rome. He was the son of Leonardo di Buonarroti, brother of the great Michelangelo; he studied mathematics and natural philosophy under Galileo, and became a member of the Academy of La Crusca and of the Florentine Academy. He is chiefly famous for *La Tancia*, a drama, and *La Fiera*, a series of 5 comedies.

**Angelot**, a gold coin, struck in France by Henry VI. of England; also a Fr. gold coin first struck in 1340; also a musical instrument like a lute.

**Angels of the Elements**, see **ELEMENTAL SPIRITS**.

**Angelus à Sanoto Francisco**, the assumed name of the Franciscan monk, Richard Mason (1601-78), author of *Regula et Testamentum S. Francisci*, 1643; *Apologia pro Scoto Anglo*, 1656, and other rare works.

**Angelus Bell**, in Rom. Catholic countries, is a bell rung 3 times a day, at dawn, noon, and sunset, to call the faithful to prayer. It was instituted in 1326. Its name is derived from A. Domini, the angelic salutation to the Virgin Mary. Millet has painted a famous picture with this title.

**Angelus Silesius** (1624-77), a Ger. poet and philosopher, b. at Breslau. His proper name was Johann Scheffler. He first practised medicine, but in 1653 joined the Rom. Catholic Church, though his parentage was Protestant. He wrote books on mysticism and also many hymns, which are still used by Protestants in Germany.

**Anger** (Old Norse *angr*, pain) is a primitive emotion, often associated with fear, which is experienced by man in common with higher animals. In its lowest forms A. suggests destructive violence and infliction of pain on the object, animate or inanimate, which aroused it, or even on inoffensive objects which have had no share in causing it. In a higher form it desires to inflict mental suffering: here again the angry party receives relief from imposing it on innocent victims. From this it will be seen that it has a deadening effect on the reasoning faculty, and is, in fact, a form of temporary madness.

The physical accompaniments of A. are changes in colour (usually flushing, but in some cases pallor), aggressive postures, agitated respiration, quickened heart-beats, muscular changes of the eyebrows and jaw—arising from protective and biting instincts—contraction of the pupils, glandular secretions (such as tears and increased flow of saliva). The feelings find expression in animals in snarling and growling, in man in crying, screaming, and hysterics. See P. Jessen, *Versuch einer wissenschaftlichen Begründung der Psychologie*, 1855; A. Bain, *The Emotions and the Will*, 1859; Charles Darwin, *Expres-*

*ion of Emotions in Men and Animals*, 1872; H. M. Stanley, *Evolutionary Psychology of Feeling*, 1895; G. F. Stout, *Manual of Psychology*, 1901; J. T. MacCurdy, *The Psychology of Emotion*, 1925; J. Macmurray, *Reason and Emotion*, 1935.

**Angermanland**, a dist. in Sweden and under the gov. of Västernorrland. It is a wild and picturesque country, and well cultivated. Its riv. the Angerman, is over 200 m. in length, and joins the gulf of Bothnia at the prin. tn. of Hernösand. The riv. is navigable near its mouth.

**Angermünde**, a tn. in Brandenburg, Germany, just over 40 m. N.E. of Berlin, noted for large iron works and a woollen industry. Pop. 8000.

**Angers**, the old cap. of Anjou in France, now in the dept. of Maine-et-Loire. Its old name was Andecavi. It is the see of a bishop, has a large theological college and a fine library. The castle, now used as a prison, and the cathedral were both built in the thirteenth century. The R. Maine is navigable at this point, and the dist. has extensive industries in wool and cotton. Large slate quarries are also in the vicinity. Pop. 88,000.

**Angers, Sir Auguste Réal** (1838-1919), Canadian statesman, was b. in Quebec, where he practised for some time as a lawyer. From 1874 till 1879 he sat in the Quebec Assembly, for the last 3 years as leader of the Gov. He subsequently became a puisne judge of the supreme court, which post he resigned in 1887, and was lieutenant-governor of the prov. till 1892. He joined the Thompson administration, and retained his position under Sir M. Bowell, but resigned in 1895 over the Manitoba school question. He retired from politics in 1896 on the defeat of the Tupper administration. He took an active part in the completion of the N. Shore Railway between Montreal and Quebec.

**Angerstein Gallery**, see **NATIONAL GALLERIES, THE**. The A. collection of 38 pictures was purchased by the nation in 1824.

**Angevin Line of Eng. kings** began with Henry II. (1154), who was son of the count of Anjou (whence the name), and ended with Richard III. (1485). John is sometimes erroneously described as the last of the A. dynasty because he was the last Eng. king to reign over Anjou.

**Angghiari**, tn., N. Italy, 10 m. N.E. of Arezzo. The scene of the defeat of the Milanese by the Florentines in 1440. Pop. 8000.

**Angilbert, Saint** (c. 740-814), the friend and counsellor of Charlemagne, whose daughter, Bertha, he married. He ultimately became a monk. He was a distinguished poet and was described by Charlemagne as the Homer of the age.

**Angina**, a medical term for any inflammatory disease of the throat or trachea which hinders breathing or swallowing. *a. humida* is croup.

**Angina Pectoris**, a paroxysmal pain accompanied by a sense of intense oppression about the heart. It is occasioned by a partial blockage of the coronary arteries which supply the heart muscles, and usually occurs in men over 40. The immediate cause of the attack is exertion or emotion; there is a sudden pain affecting the whole chest, then radiating through the left shoulder and penetrating sometimes right down to the fingers. Accompanying the pain is a sense of impending death, the respiration is shallow or arrested, and the patient's anxiety becomes extreme. The attack may suddenly cease, and, although there is temporary weakness, there may be no other signs of the disease until another attack. The number and frequency of attacks vary; there may be only one or two, there may be a chronic form in which the attacks grow in intensity, or a number of severe attacks may end with complete recovery. Usually the outlook is very grave.

The treatment aims at the prevention of the attack. The patient should always carry about with him small glass capsules filled with amyl nitrite, which may be broken into a handkerchief and the vapour inhaled. In the intervals between the attacks any predisposing causes, such as arterio-sclerosis should be treated; gymnastic exercises in the form of passive movements are generally of utility. Recently operative treatment has been introduced. It consists in providing a new blood supply to the heart by sewing on to its wall a piece of omentum. The latter is an apron-like fold of connective tissue which hangs in front of the intestines in the abdomen, and part of which can be moved into the thorax through an incision in the diaphragm.

**Angiolieri**, Cecoo (c. 1250-c. 1312). It, humorous poet and contemporary of Dante, on whom he wrote 3 uncomplimentary sonnets. In his poems he shows himself as an undoubted *bon viveur*, with a marked predilection for wine and women. About 120 of his sonnets are still extant.

**Angioma**, a vascular tumour caused by the enlargement or new formation of blood-vessels. There are sev. varieties.

**Angiosperms** (Gk. *αγγειον*, vessel, *σπέρμα*, seed) include the highest forms of plant life. Together with Gymnosperms (pines, etc.) they make up the great group of Phanerogams, Spermatophyta, or flowering plants; they differ from Gymnosperms in having the carpels arranged so as to form an ovary for the ovules, and, in forming endosperm after fertilisation instead of before it.

The A. are divided into 2 classes, the Dicotyledons and Monocotyledons; in the former are such flowers as buttercups, primroses, and nettles, in the latter arum lilies, grasses, and daffodils. These flowering plants do not necessarily have bright petals or sepals, but it is essential that they should have carpels and stamens; reproduction, however,

may take place also by budding, apogamy, or parthenogenesis.

**Angkor**, the old cap. of Cambodia in Asia, but now only the ruins of a city. It is surrounded by high walls, it is about 2 sq. m. in extent, and 5 gates give entrance to the city. The palaces of A. date from the sixth century, when Then-Ha (Cambodia) won its independence; they were of Hindu, not Khmer, inspiration. In Siemrat prov. are the wonderful ruins of A., or Nakawn, Wat, relics of the architectural genius of the Khmer race. See Osbert Sitwell, *Escape with Me*, 1939.

**Angle**, the difference in direction of 2 lines. If the lines are straight the A. is *rectilinear*, if curved the A. is *curvilinear*. A curvilinear A. is measured by the A. between the tangents to the curves at the meeting point. As. are usually measured in degrees, one degree being 1/360th of a complete revolution. In circular measure the unit is a *radian*, which is an A. at the centre of a circle opposite an arc equal in length to the radius; there are 3.14159 . . . radians in 180°. A *solid A.* is the space contained by 3 or more planes meeting at a point. A *dihedral A.* is an A. between 2 planes, a *trihedral A.* one between 3 planes. *As. of incidence, reflection, and refraction* are, in physics, the As. formed by the direction of a wave with the normal to the surface at the point of incidence, reflection, or refraction. The *critical or limiting A.*, in light, is the A. at which a ray of light strikes the surface between 2 media so that the refracted ray passes along the surface. The *critical A.*, in friction, is the A. at which the component of the weight directed down the slope of the inclined plane balances the friction. The *A. of capillarity* is the A. formed, due to surface tension, when a liquid is placed in contact with a solid.

**Anglers** are any fish of the div. *Pediculati* of the order *Teleostei*, and belong to the family *Lophidae*. The *Lophius piscatorius*, known also as monk-fish, sea-devil, frog-fish, or goose-fish, angles for its prey in a peculiar fashion. The 3 anterior spines of the dorsal fin are transformed into tentacles, the foremost of which ends in a bright, worm-like tip which acts as bait and can grow again readily. The A. swims badly and lurks near the coast; it attains a length of 3 to 5 ft., and is found in Europe and America.

**Angles**, or **Angli**, a Ger. tribe who occupied the dist. of Schleswig-Holstein, a large number of whom came to Britain in the fifth century and settled in E. Anglia, Mercia, and Northumbria. From them the name England is derived (Angleland). These people were first mentioned by Tacitus, who states that they were a part of the Sueti, and Lindenberg and Leibnitz have preserved fragments of the anct. laws used in common by the Angli and the Varini.

**Anglesey** is an is. off the N. Wales coast, and divided from the mainland by the Menai Straits. It is 21 m. long

by 19 broad. It forms a co. and sends a member to Parliament. Lead, copper, and zinc are among the minerals found on the is., and sheep- and cattle-breeding are carried on. It is joined to the mainland by a fine suspension bridge and also by the Britannia tubular bridge. Holyhead is an adjoining is., and the starting place of the route to Ireland. Beaumaris, Holyhead, and Amlwch are the chief tns. Pop. 52,000.

**Anglesey, Henry William Paget, first Marquess of (1768-1854),** and a son of the earl of Uxbridge. He entered the army and served in Flanders and the Peninsula. He was created marquess of A. for his bravery at the battle of Waterloo, where he lost a leg. He was appointed lord-lieutenant of Ireland in 1828, and was afterwards responsible for the Irish Board of Education.

**Anglia, East,** a kingdom founded by Uffa in 575, which consisted of Norfolk, Suffolk, Cambridge, and the Isle of Ely, and formed one of the kingdoms of the Saxon Heptarchy. It was afterwards dependent on Mercia, and submitted to Egbert, king of Wessex, in 826. Soon after it was invaded by the Northmen, and became a Dan. kingdom, until it was taken by Edward the Elder, 921. Under Canute it was one of the 4 great earldoms, the other 3 being Northumbria, Mercia, and Wessex.

**Anglican, see CHURCH OF ENGLAND.**

**Anglicanism** is the name given to the body of doctrines and observances in the Church of England (q.v.) and of those churches throughout the world in communion with it. The recent hist. of A. in Great Britain has been that of the struggles of the different sections within it, but chiefly that of the Anglo-Catholic and Evangelical parties. The Anglo-Catholics (q.v.) hold to a body of doctrines which tend, increasingly, to resemble in dogma and ritual the beliefs and practices of the Rom. Catholic Church. This section is popularly known as the High Church party. The Evangelicals, termed the Low Church party, have sought to preserve the teachings and practices of the Protestant Reformation. The drift 'Romeward' of the Anglo-Catholic section became so pronounced towards the end of last century that Parliament appointed a royal commission in 1904 to consider the matter of eccles. discipline. The commission reported in 1906, and its report set in motion a movement for the revision of the Book of Common Prayer. This, as used in the churches to-day, is essentially that of the reign of Charles II. (1662), and it was held by many, of all parties in the Church, to require revision to bring it more into line with the requirements of to-day. So began that revision of the Prayer Book which forms the outstanding event in the recent hist. of A.

The National Assembly of the Church of England in July 1927 passed, by 617 votes to 133, the Prayer Book Measure. The majority included 34 bishops

and the minority 4 bishops. This measure allowed certain alternative or additional forms of worship to that in the Prayer Book, and, from the colour of its cover, the new Prayer Book was known as the Green Book. Measures passed by the National Assembly require the assent of both Houses of Parliament and of the Crown. The House of Lords gave its assent to the Prayer Book Measure by 241 votes to 88, but the House of Commons on Dec. 15, 1927, rejected the measure by 238 votes to 205. The bishops, deeming this rejection due to 'avoidable misunderstandings,' slightly revised the measure, which was again approved by the Assembly (396 votes to 157), but once more, in June 1928, failed (by 266 votes to 220) to secure the approval of the Commons. Thereafter the bishops decided to put into force the non-controversial parts of the Green Book.

**Angling** is the art of catching fish with a line and hook which is baited with worms, flies, or small fish. The antiquity of this pastime is proved by mention of it in the works of Gk. and Lat. writers, while allusions to it appear in the O.T., and the pursuit of A. is known to have been practised in ant. Egypt. Much has been written about it, and the oldest work printed in Eng. on the subject was issued in 1496 by Wynkyn de Worde, in a later ed. of a work on hunting and hawking, *The Book of St. Albans*, which appeared in 1486. To a woman may belong the honour of being first to write on the piscatorial art, for the work is ascribed to a nun, the prioress of a nunnery in Hertfordshire, Dame Juliana Berners.

The most famous work on the subject, however, is that of Izaak Walton, a linen-draper of Fleet Street, whose book, *The Compleat Angler or The Contemplative Man's Recreation*, is world-renowned. The first ed. appeared in 1653, and passed through 5 eds. during the author's life, the last being in 1676. With the later eds. a treatise was added by Walton's friend, Charles Cotton, containing instructions how to angle for a trout or grayling in a clear stream. This essay is still usually printed with the work.

*The Compleat Angler* is in truth more than a work on fishing, for the author depicted the delights of the countryside with great delicacy and charm, and the unaffected humour of the dialogue and its purity of style all add to the high reputation of the book. Since Walton's day the output of books upon the subject has been very prolific. Some of the prin. are mentioned at the end of this article. In this article we shall deal chiefly with fresh-water fishing.

The chief appliances needed by anglers are the rod, line, and hook. The first are made of various materials. Cane rods are the most common and the lightest, but other rods are made of yellow deal in a 7-ft. joint and a hazel joint of 6 ft., with a piece of fine-grained yew tapered to a whalebone top and measuring



about 2 ft. Salmon rods are usually made of split cane and greenheart. The reel is an apparatus for winding up the line, and is made of aluminium alloy, gun metal, brass, or, in the case of sea-fishing and spinning reels for pike and perch, of wood. The line is made of silk waterproofed or fine cord, and varies in length from 20 to 100 ft. according to the size of the water and the fish angled for. At the end is a piece of fine gut to which the hook is fixed, and above this is the float, made as a rule of quill, either of the porcupine or the goose, though for heavy fish or strong streams the floats are frequently of cork. The line or gut cast below the float must be loaded to balance the float. The angler does this himself, the amount of lead on the line varying with the size or buoyancy of the float. The angler must, of course, choose his bait with reference to his fish. Artificial flies are of 2 varieties, the dry fly and the wet fly. The former is used for cocking on the water and the latter for sinking beneath the water. The dry fly floats on account of its extra dressing. Dry fishing is done with single flies, while 2 or 3 wet flies are used at one time. Wet flies are used in strong running streams.

The finest fresh-water fish in this country is undoubtedly the trout, and affords the best sport to anglers. They abound in most of our lakes and rivers, and are usually angled for with an artificial fly. They are voracious, and by their agility and cunning frequently succeed in making their escape. A good landing-net is necessary for this fish. The trout usually spawns in Oct. and Nov., sometimes earlier or later, according to the season.

There is no great measure of agreement on the choice of rods for fly-fishing. Indeed, as has been well said, 'One of the charms of angling is that it presents an endless field for argument, speculation, and experiment' (T. E. Pritt). But for loch fishing, anglers at least seem to agree that nothing is to be gained by laying down a hard and fast rule, because so much depends on the characteristics of the individual. Progress in rod-building has been rapid in the last century, and 'with the advent of the built cane or split bamboo rod, we have an article which combines lightness with strength to an extent which no wooden rod can equal' (R. A. Chrystal). In salmon-fishing the very long rods of 18-20 ft., once considered essential, have almost disappeared, as the same work can be done by a cane rod of 16 ft., as far as length of cast is concerned—though the long rod enabled the angler to hang the fly over fish lying well out in a river. In loch fishing the conditions are different and trout rods in general have undergone a shortening, so that on a loch a rod of 14 ft. is about the longest in use. Those who still use rods of 14 ft. for loch fishing mostly use wooden rods. In choosing a line for loch fishing the almost universal practice is to have

it short and to splice on enough backing almost to fill the reel. Most reels for trout rods are big enough to take 30 yds. of line and 40 to 50 yds. of thin silk backing, and this is ample to deal with most heavy fish. A level line, which is as heavy as the rod, will cast properly, and is most generally useful, as a very light one flaps in the wind too much and causes loss of touch with the flies. Greasing is of doubtful value; it keeps some lines in good order, but others become soft and sticky and are useless long before they are worn out. For worm fishing for trout, the rod should be fairly stiff; one cannot throw a bait accurately with a supple one. Perhaps the best rod is one not less than 11 ft. and not more than 14 ft. long. For fly-fishing for brown trout on rivers, the rod should be of greenheart or split cane, not too supple in the middle, while the point should be fairly flexible—for with a rod supple in the middle, the angler cannot cast into a wind coming from his front, and not well with a wind blowing from either side; and a stiff top piece does not yield when a fish splutters, and thus the hook is liable to be torn from the fish's mouth. Present-day ideas favour very short and very light rods; but some anglers are strongly opposed to both and think that the length and weight of the rod must depend on the breadth of the river. The reel should be too stiff rather than slack and those made with a brake which can be regulated are often preferred.

The salmon is one of the angler's most coveted prizes and affords excellent sport. It is partly a fresh-water and partly a salt-water fish, though its spawn is generally deposited in the former. The spawning season is from the end of autumn until the beginning of spring. The length of rod for this fish is usually from 16 to 20 ft., and the best fly to use is a large one of gaudy colours. The Scottish rivers are famous for their salmon. See further under SALMON.

Roach are generally caught with maggots or paste lying on the bottom of ponds or streams, or with brandling worms. The perch is a bold-biting fish, but, curiously enough, it will never touch a fly. The best bait is a worm. The pike, or jack, as the young ones are called, are perhaps the greediest of fish, and spawn about Mar. in very shallow water. The finest specimens are those found in clear rivers. The best bait is a small fish.

The barbel is rather a heavy, dull fish, and does not give such good sport as many others, and for this it is a good plan to use ground bait, sometimes put in over-night. Bream are generally reckoned as pond fish (golden bream are common in the Norfolk Broads), although they are sometimes met with in slow-running streams. In fishing for these the angler should take care to keep concealed from the fish and let his bait sink near the bottom among the weeds. Carp are also pond fish, and, like touch, thrive best in mud, but never

well in cold, bare waters. Another well-known pond fish is the tench, but, like carp, these are found in sluggish rivers. They are noted for frequenting the foulest and muddiest portions of the pond, so the fisherman must angle for these very near the bottom and allow the fish plenty of time to gorge the bait. They are in season from Sept. until the end of May. Grayling are remarkably timid fish, and must be angled for with very fine tackle, and when hooked the angler must be careful to work the catch carefully as the hold gives way easily in the mouth. They will return to the bait, however, as a rule. The chub will rise easily at a natural or an artificial fly, and at spawning time will take most bait, such as worms, etc. It usually requires the aid of a landing-net.

Dace are very active and cautious, but will nearly always rise to the fly of a skilful angler. They frequent gravelly and sandy bottoms and deep, weed-shaded holes. In sultry weather they are often caught in shallows with gentles or grasshoppers. Bread and bran kneaded into small round cakes is a very good ground bait for these fish, but it must always be thrown upstream. The gudgeon is allured with almost any kind of bait. It spawns 2 or 3 times a year, and frequents gentle streams with gravelly bottoms. In A. for gudgeon a good plan is to stir up the bottom previously, which rouses the fish from a state of inaction and causes them to collect in shoals. Some anglers will use 2 or 3 hooks for this fish. A float is always used, but time should be allowed for the fish to nibble at the bait, as they will do this for some time before swallowing it. The loach can best be caught with a small red worm, while minnows are of little use for sport, but make excellent bait for pike, trout, salmon, and other fish. Close seasons are observed for most fish according to their natures and haunts.

For further details of all the fish mentioned here the reader is referred to the articles under their various headings, where their natures, habits, and haunts are dealt with more fully. Those we have mentioned here are, of course, those taken by anglers in Great Britain. The Anglers' Association is the chief body in this country which looks after the interests of this sport.

**Bibliography:** Viscount Grey, *Fly Fishing*, 1899; W. E. Hodgson, *Trout Fishing*, 1904, *Salmon Fishing*, 1906; J. Bickerdyke, *Angling in Salt Water*, 1921, *Angling for Pike and The Book of the All-Ireland Angler*, 1922, *Angling for Coarse Fish*, 1923; F. M. Halford, *Modern Development of Dry Fly*, 1923; J. T. Jenkins, *The Fishes of the British Isles*, 1925; A. Chrystal, *Angling Theories and Methods*, 1927; W. Keith Rollo, *The Art of Fly Fishing*, 1931; Herbert Palmer, *The Roving Angler*, 1933; Sidney Spencer, *The Art of Lake Angling with Sunk Fly*, 1934; Eric Taverner and John Mooto, *The Angler's*

*Week-End Book*, 1935; R. M. Robertson, *Angling in Wildest Scotland*, 1939; E. Taverner, *Fly Fishing for Trout*, 1939, and *Fly Fishing for Salmon*, 1942.

Anglo-Catholics are, as their name indicates, those in the Church of England who regard that church as part of the Universal, or Catholic, Church. This section, therefore, tends to resent the term Protestant and to stress the term Catholic. The more popular name for this party is the 'High Church' party. Anglo-Catholicism is undoubtedly a growing power in the Church of England, and the increase of its influence can be ascribed, in part, to the zeal of its adherents and the intellectual eminence of its protagonists. A.-Cs. are organised in the Eng. Church Union, and their most influential organ is the *Church Times*. From time to time Anglo-Catholic congresses are held in London, which afford evidences of an emotional fervour that has been compared to that roused by the great Wesley, the founder of Methodism.

In general it may be said that A.-Cs. display a desire for recognition by the Rom. Church. The claim to papal infallibility is denied, but in many churches in England the whole of the Rom. ritual and dogmas are practised and inculcated. How far the movement has progressed from, say, the Eng. Protestant position of the eighteenth century may be gauged by the 'Declaration of Faith,' issued in June 1924. This document, signed by 3000 Anglican clergymen (including Bishop Gore), was directed to the Orthodox Patriarch of Alexandria, and stated, *inter alia*, that the signatories held that the consecrated elements in the Anglican Eucharist 'become the true Body and Blood of Christ, and we hold that Christ, thus present, is to be adored.' The Prayer Book Measure, 1927 (see ANGLICANISM) was the Church Assembly's attempt to direct and control the movement.

**Anglo-Egyptian Sudan.** See SUDAN.

**Anglo-Israelite Theory.** During the closing years of the kingdom of Israel, it is known that a considerable proportion of the inhab. of N. Palestine were carried into slavery. In the reign of Pekah no fewer than 27,000 individuals appear to have been taken to Media and Mesopotamia, after the fall of Samaria in 721 B.C. (2 Kings xv. 29). The kingdom of Judah was treated in a similar fashion by Babylon in 587 B.C., but hist., whilst recording the return of the latter, is silent regarding the fate of the former. Thus the 10 tribes which were lost disappear from hist. entirely, and naturally many theories have been propounded as to their probable fate and present-day whereabouts. One of these is that the inhab. of Great Britain and the U.S.A. are sprung from these lost tribes. This theory, known as the A.-I. T., though even now promulgated, has not made much headway. For particulars see Philo-Israel, *An Enquiry establishing the Identity of the British Nations with*

*the Lost Tribes*, 1899, and the *Book of Mormon* by Joseph Smith.

**Anglo-Japanese Treaty.** By the terms of the treaty signed in 1902, Great Britain and Japan undertook to support each other in maintaining the independence and territorial integrity of China and Korea. If measures taken towards this end caused hostilities between one party to the agreement and another foreign power, the second party was to maintain a strict neutrality, but to come to the assistance of the first party when attacked by more than one power. In 1905 this agreement was amplified by an offensive and defensive alliance, applying to E. Asia and India. By the terms of this treaty the respective govts. undertook to support each other in the maintenance of their territorial rights and in the preservation of the independence and integrity of the Chinese empire. The agreement gave a free hand to Japan in the protection of her interests in Korea, and similar freedom to Great Britain on the Indian frontier. It also affirmed the principle of equal opportunities for the commerce and industry of all nations in China. In any hostilities caused by aggressive action directed against the interests specified, the 2 countries agreed to wage war and make peace together. This agreement was renewed, in the form of a new treaty, on July 13, 1911, for a period of 10 years. Substantially the new treaty re-enacted the provisions of the older one, but had one important modification relating to arbitration with third powers. This innovation was set out in Article IV., which ran: 'Should either High Contracting Party conclude a treaty of general arbitration with a third Power, it is agreed that nothing in this Agreement shall entail upon such Contracting Party an obligation to go to war with the Power with whom such treaty of arbitration is in force.' The alliance was formally dissolved in 1921 through the operation of the agreement reached at the Washington Conference on disarmament (1921-22).

**Angliomania** is a term used for the imitation amongst the Fr., Ger., or other foreigners of Eng. manners and customs, or an admiration of anything Eng. In the eighteenth century Eng. literature was greatly admired in Germany, and numerous Eng. books were translated into Ger. In France, just before the outbreak of the Fr. Revolution, there was a decided admiration of the free institutions of England. On the other hand, Anglophobia is a horror or fear of anything Eng.

**Anglo-Saxon Chronicle**, a compilation made in the reign of King Alfred, which may be his own work or written under his guidance. It is the most instructive extant work of A.-S. prose. It is written in a rhythmic style and contains many forceful descriptions of fighting episodes, such as the battle of Ashdown.

**Anglo-Saxon Language and Literature.** see SAXON LANGUAGE AND LITERATURE.

**Anglo-Saxons**, see SAXONS.

**Angmering**, a vil. of Sussex near the coast and not far from Worthing. The newly built part is residential and extends towards the sea.

**Angoche**, see ANGOSA.

**Angola**, the name applied to the Portuguese possessions on the W. African coast, lying between the Congo and Benguela or from the border of Belgian Congo to Cape Frio. A. was discovered in 1486 by the Portuguese and was long famous as a centre of the slave trade. Its landward boundaries are the Fr. Congo, the Belgian Congo, Rhodesia, and S.W. Africa. It has a coast-line of 1000 m. on the Atlantic Ocean. The waters of the Itua (Cana Falls and the Kunene R. are shared jointly for irrigation and power purposes by Portugal and the Union of S. Africa. The area is about 485,000 sq. m. and it is divided into 12 administrative dists. and ruled by a high commissioner. The coast is barren and unhealthy, but inland the country is well watered and tobacco, rice, and sugar are widely grown. The 3 chief rvs. are the Kwanza, the Kunene, and the Kwango. In the mts. are various mines, chiefly copper, lead, and sulphur, and petroleum is also obtained. The resources of the country are not by any means fully developed under Portuguese rule. The old cap. was Sao Paulo de Loanda (*q.v.*) but in 1928 Huambo, now called Nova Lisboa, was made the cap. The other chief tns. are Kabinda, Benguela, and Nova Redondo, which are also seaports. The chief products are maize, coffee, sugar, rubber, and coco-nuts as well as the products noted above; and some of the best agric. lands are traversed by the Benguela railway running from Lobito Bay to Katanga (and thence to Heira)—the last-named being a mineral dist. Benguela's trade has declined but it still exports considerable quantities of beeswax, sugar, and maize, though ships have to lie 2 m. out, the port being on a roadstead. Lengue, Cubal, S. Pedro, and Ganda are other trading centres. There is a wireless station and aerodrome at Nova Lisboa (Huambo). The Mossamedes railway goes inland from Mossamedes to Sa da Bandeira (Huila).

*Consult* Sir Harry Johnston, *The Colonisation of Africa*, 1899; A. Negreiros, *Angola*, 1901; F. I. de P. Conceiro, *Angola*, 1910; A. Marvand, *Le Portugal et ses colonies*, 1912; H. Marquardson, *Angola*, 1920; J. C. B. Statham, *Through Angola*, 1922; W. D. Hamby, *Ovimbundu of Angola*, 1934.

**Angoniland**, a dist. of E. central Africa, situated to the S.W. of Lake Nyasa. It consists of a plateau, with an average elevation of 4000 ft. The inhab., the Angoni, have fine physical development.

**Angora**, see ANKARA.

**Angosta**, see ANCOXA.

**Angostura** (Santo Tomé de la Nueva Guayana), see CIUDAD BOLIVAR.

**A. Bark** is derived from *Cusparia febrifuga*, a species of S. Amer. tree of the

order Rutaceæ. It is used in the manuf. of drugs which have a tonic effect, but its value as a febrifuge is small. Trinidad is the source of A. bitters, the manuf. of which was transferred to the is. from A. or Ciudad Bolívar in 1875, owing to the troubled state of Venezuela.

**Angoulême**, a Fr. city in the dept. of Charente, 60 m. N.E. of Bordeaux. It is situated on an isolated rocky hill. There is an old castle in the market-place, once the residence of the counts of A. The cathedral is very old, and was restored in 1120. A considerable trade is carried on in paper in the dist., where there are many mills. Pop. 39,000.

**Angoulême, Charles de Valois, Duke of** (1573-1650), was b. in Apr., being the natural son of Charles IV. of France and his mistress, Marie Fouchet. He was successively commended to the good wishes of Henry III. and Henry IV. During his early youth he conspired against Henry IV., and suffered imprisonment from 1605 to 1616. In the latter year he was released, and spent the rest of his life as a soldier and diplomat of France, taking part in the Thirty Years War and being in command at the siege of La Rochelle. He was an author of some note.

**Angoulême, Duchesse de Montmorency et d'**, see **DIANE DE FRANCE**.

**Angoulême, Louis Antoine de Bourbon, Duke of** (1775-1844), was the eldest son of Charles X. of France, and was b. in Aug. He was educated at Turin in military studies, but retired from France at the time of the revolution. In 1799 he married his cousin, Marie Thérèse, and on the recall of his uncle, Louis XVIII., to France he was made lieutenant-general of the kingdom. He attempted to oppose Napoleon's return in 1815, but was deserted by his troops. After the revolution of July he retired with his father, Charles X., into exile. He d. at Görz.

**Angoumois**, the name of one of the provs. of France before the revolution of 1789. It is now included in the dept. of Charente.

**Angoxa, Angoche, or Angosta**, tn., riv., and coast dist. of Portuguese E. Africa. The dist. produces cocoa, sesame oils, ground-nuts, rubber, and ivory. The inhab. are mostly Arabs.

**Angra do Heroísmo**, a seaport in Terceira, and cap. both of Terceira and of the whole group of the Azores. It is strongly fortified, has a cathedral, fine churches, a military college, and an arsenal. It exports grain and wine, but its harbour is very much exposed. Pop. 31,000.

**Angra Pequena**, a bay in S.W. Africa, lat. 28° 38' S., long. 15° E., on which stands the tn. of Lüderitz. This was estab. in 1883 by a Bremen merchant of that name, and in 1884 the dist. was proclaimed a Ger. protectorate. The surrounding country is desert, and the harbour itself is not good, freight having to be landed by lighters. The tn. is connected by rail with the S. African system at De Aar.

**Angrezabad**, see **ENGLISH BAZAR**.

**Angrì**, tn. of S. Italy, 15 m. N.W. of Salerno. Pop. about 18,000.

**Ångström, Anders Jonas** (1814-74), Swedish physicist, was educated at Upsala Univ. From 1867 to his death he was secretary to the Royal Society of Sciences at Upsala, at which Univ. he had already occupied sev. posts. His chief work is *Optiska Undersökningar*, on spectrum analysis. The unit for expressing wave-lengths of light is named after him.

**Anguilla**, or Snake Is., one of the Leeward Is. (Brit. W. Indies), has an area of about 35 sq. m. The surface is flat, some cattle are pastured there. Sea Is. cotton and salt are the chief products. Pop. 5500.

**Anguis** is a genus of reptiles of order Lacertilia and family Anguide. *A. fragilis*, the blind-worm, is a limbless, snake-like lizard with well-developed eyes, found in Asia, Europe, and America. The genus is viviparous.

**Angul**, dist. in the prov. of Orissa, India. Rice is principally grown. Area 1681 sq. m.; pop. 200,000.

**Angular Motion**, the motion of a body about a fixed axis. As different parts of the body describe arcs of different lengths in the same time, the A. velocity is understood to be the velocity of a point at unit distance from the axis of rotation.

**Angus**, official and anct. name (whence the earls of A. derive their title) for Forfarshire, a maritime co. of Scotland, bounded by Aberdeenshire and Kincardineshire on the N., the North Sea on the E., the Firth of Tay on the S., and Perthshire on the W. It has an average length of 35 m. and a width of 25 m. and an area of 885 sq. m. The surface is varied: the Binnchinn Hills lie in the N., and between the heights are fertile valleys. The Sidlaw Hills, rising to 1300 ft., run parallel to the former range, and between these 2 systems stretches the wide valley of Strathmore. The chief streams are the Isla and the N. and S. Esk; the lochs are Forfar, Lee, Balgavies, etc. Sandstone and granite are quarried in the hills. Wheat is grown extensively in the valley of Strathmore; oats and potatoes are other crops cultivated. The salmon and herring fisheries are important, but the chief industry is the flax and jute manuf., Dundee being the seat of the linen trade. At Carnoustie and Monifieth on the coast there are noted golf links. The chief tns. are Forfar (the co. tn.), Dundee, Arbroath, Montrose, Brechin, Kirriemuir. Pop. (1931), 270,190.

**Angussola** (or *Angusciola*), Sophonisba (c. 1535-c. 1625), was b. at Cronoma. She was a famous It. portrait-painter, and of her Van Dyck is said to have declared that he learnt more from her conversation on art than from the best masters. She was called to the Sp. court by Philip II. to paint portraits of himself and his queen.

**Anhalt**, until 1918 a duchy of the Ger. empire, later a free state. The

country is agric., and is generally fertile, the mountainous parts affording timber and some minerals, chief of which are lignite and salt. Till 1918 Protestantism was the state religion. Area 906 sq. m.; pop. 364,000.

**Anhinga**, the Amer. snake-bird, darter, or water-turkey (*Potus anhinga*), akin to the cormorants.

**Anholt**, a small Dan. is. in the Cattegat. It was occupied by the Eng. from Mar. 1811 to Jan. 1814. Pop. 250.

**Anhui**, or **Anhui**, see NGANWHEI.

**Anhydride**, or anhydrous acid, a term applied to compounds formed by the dehydrating of acids, or which represent in their composition the acid minus water. Thus sulphuric A. is  $\text{SO}_2 = \text{H}_2\text{SO}_4 - \text{H}_2\text{O}$ .

**Anhydrite**, a mineral consisting of calcium sulphate,  $\text{CaSO}_4$ , but differing from gypsum in that it contains no water of crystallisation. The colour is white, red, grey, or blue, and it usually contains a small amount of sea-salt, being found in salt deposits. Nearer the surface the mineral absorbs water, and is converted into gypsum; its liability to this change makes it unsuitable for building purposes.

**Ani**, an anct. ruined city of Armenia, about 25 m. S.E. of Kars on the Arpa-chai. During the Middle Age. it was the seat of the Bagratide kings of Armenia. About 1062 it was taken and pillaged by the Seljuks, and during the next 2 centuries it was repeatedly sacked. Its ruin was finally completed by an earthquake. Sev. interesting remains (of buildings and the city wall) are still to be seen.

**Aniche**, tn., dept. of Nord, France, 8 m. E.S.E. of Douai. Has coal-mines, glass-works, and chemical manufs. Pop. 8000.

**Aniello**, **Tommaso**, called by corruption Masaniello (1623-17), a young fisherman, was b. at Anali and d. at Naples. At this time the duke of Arcos, viceroy of Philip IV. of Spain, was governor of Naples, and in 1647 he levied a tax on fruit and vegetables. The people with A. as their chief rose in revolt, and the troops of the viceroy were defeated. Cardinal Filomarino was chosen as mediator between the viceroy and the people, and all imposts upon articles of consumption were abolished, and the privileges granted by Charles V. were restored. For a short time A. was master of Naples, but he gave himself up to despotism and excess, and was assassinated by the viceroy's agents.

**Aniline**, amidobenzene or phenylamine,  $\text{C}_6\text{H}_5\text{NH}_2$ , first prepared by the dry distillation of indigo, whence it derives its name (Portuguese *anil*, indigo). It is now manuf. by the action of steam and iron scraps, together with a little hydrochloric acid, on nitrobenzene contained in a cast-iron cylinder with a stirring apparatus. Lime is added when the reduction is complete and the A. distilled with steam. It is also obtained by the electro-reduction of nitrobenzene.

A. is a colourless liquid, but if not pure

it turns brown on exposure to the air, probably owing to the presence of sulphur compounds. It boils at  $183^\circ$  and has a sp. gr. of 1.024 at  $16^\circ$ . It is slightly soluble in water, but is easily dissolved in alcohol and benzene. It is very poisonous if taken internally, and workmen who are engaged in manufs. in which it is used often suffer from headaches and nausea through inhalation of its vapours. It forms salts with the mineral acids, combines with alkyl iodides to form secondary and tertiary amines, and when heated with acetic acid it produces acetanilide or antifebrin.

A. is largely used for the manuf. of dyes and the preparation of benzene derivatives. The so-called A. dyes (see DYES) are not necessarily derivatives of A., but were developed after the study of A. compounds which provided the earliest dyes, e.g., mauveine. *Rosaniline*, or magenta, is produced by the oxidation of A. and toluidine. By substituting methyl groups for hydrogen, the colour becomes reddish-violet and then bluish-violet as the number of methyl groups increases. By substituting ethyl, phenyl, or benzyl groups still more marked changes are produced, so that a series of reds and blues with all their intermediaries can be obtained in substitution products of rosaniline.

**Anima Mundi**, an anct. belief that all the chances and changes of the universe are due to an over-ruling consciousness, just as the ordering of the body is due to the operation of the human mind. Anaxagoras was one of the earliest westerners to believe that the universe was ordered by a single consciousness or reason. Aristotle held much the same view, but he held that nature itself is a living, conscious being, separate from God, who is a transcendent spirit. The Stoics' belief merged into pantheism, for they conceived of the A. M. as pure spirit, the one vital force pervading everything. The belief was revived by Cornelius Agrippa (1486-1535), who, however, changed the terminology to *spiritus mundi* and has been held with slight variations by many moderns, including Bruno, Sebastian Franck, Boehme, Van Helmont, More, and Cudworth.

**Animalcules** (dimin. of Lat. *animal*, living being), a term formerly applied to the smallest forms of animal life such as can be seen only with the aid of a microscope. They include Bacteria, Protozoa, and Rotifera, and the term is applied in a loose sense to the Infusoria.

**Animalcules**, **Bear**, or **Sloth**, see TARDIGRADA.

**Animalcules**, **Wheel**, see ROTIFERA.

**Animal Flowers**, a name sometimes applied to the genus *Actinia*, a sea-anemone. The name, of course, originated in the resemblance to a flower of this polyp, which belongs to the animal kingdom.

**Animal Magnetism**, see HYPNOTISM.

**Animal Worship** is a cult found in some form or another in most anct. religions, and to be found at the present day among notable races. Its origin is doubtless

due to various interacting causes. Savages early held that animals had souls (see ANIMISM), and since the animals were swifter, stronger, and infinitely more cunning than themselves, they respected and feared them. Then the idea of the transmigration of souls led to the belief of the souls of ancestors being present in some particular beast. Connected with this is the totem system so general in America. Every tribe and div. has its totem or figure of an animal which it holds sacred, regarding the animal as its protector and its image as a charm. Somewhat similar to this was the Teutonic use of the boar, but the Amer. Indians further claim tribal descent from the beast in question. The origin of this idea is quite uncertain. Herbert Spencer and many ethnologists hold that the confusion arose through a remote ancestor having received some nickname descriptive of him (e.g. if long-legged he might be nicknamed 'the crane'), and the surname having afterwards been taken literally. A. W. may be divided into 2 great classes, viz. that in which the animal itself is worshipped, and that in which the animal is revered as a symbol of a spirit. The prin. race now practising A. W. are the Hindus. 'Here the sacred cow is not merely to be spared; she is, as a deity, worshipped and bowed to daily by the pious Hindu, who offers her fresh grass and flowers. Siva is incarnate in Hanuman, the monkey-god, as Durga is in the jackal; the wise Ganesa wears the elephant's head; the divine king of birds, Garuda, is Vishnu's vehicle; the forms of fish and boar and tortoise were assumed in those avatar-legends of Vishnu, which are at the intellectual level of those Red Indian myths which they so curiously resemble.'—Tylor's *Primitive Culture*, 1871. See also ANIMISM; TOTEMISM. See Andrew Lang, *The Secret of the Totem*, 1905; Sir J. G. Fraser, *Totemism and Exogamy*, 1910, and *Totemica*, 1937.

**Animals** (Lat. *animus*, mind), living organisms which are distinguished from plants by their powers of locomotion, capacity for assimilating organic substances, and the absence of the compounds chlorophyll and cellulose. None of these distinctions, however, is complete;—they may be unicellular, may be unable to move from the spot to which it is attached,—plants are usually in this condition, but they frequently have reproductive cells or spores which are free-swimming. Corals remain stationary, whilst amongst plants, diatoms and certain algae and fungi have distinct powers of locomotion; some plants (e.g. the sundew) are insectivorous and digest organic matter; chlorophyll is absent from fungi; the cellulose cell-wall is absent in some plants and present in some A. such as tunicates, or sea-squirts. Both plants and A. frequently live in a parasitic state. A. require to have their carbohydrate and protein substances already formed for them, and take into their systems in living or dead form pre-

existing organic life; all green plants, however, which possess chlorophyll can, with the aid of sun and air, manufacture from inorganic salts their own carbohydrates and protein substance. It is thus in their method of nutrition that A. differ fundamentally from green plants. Both plants and A. are sensitive to external conditions and have an irritable protoplasm. In reproduction there is again great similarity, for in the lowest forms of each cell-div. may take place or specialised cells may form new life. Higher A. and higher plants differ from one another to a great extent, but the processes of nutrition and reproduction are common to both.

In view of the difficulty of an absolutely distinct line of demarcation, it is justifiable to assert that both forms of life have a common origin and that the processes of differentiation have roughly followed the 2 directions as laid down in the above definition. That both botanist and zoologist consider certain forms to belong to their respective spheres is a gain rather than a loss, and does not disturb the bases of their classification.

In all but the lowest A. the process of life is carried on by a more or less complex machinery of organs—muscles, alimentary canal, heart and blood-vessels, gills or lungs, nervous systems, organs of excretion, and organs of reproduction. But in all A. as in all plants, the effective and essential part consists of protoplasm, and A. exist with structures varying from the mere mass of protoplasm of the amoeba to the highly complex organism of man.

**Classification.**—Each large group is divided into phyla, which are divided either into classes containing orders or directly into orders, and these again are divided into families, genera, and finally individual species. In a very broad sense they may be grouped under the heads of Invertebrates and Vertebrates. The following groups or phyla are arranged in order of complexity:

**A. Invertebrates.** I. Protozoa, unicellular organisms such as amoeba. II. Porifera, or sponges. III. Coelenterata, including jelly-fish, sea anemones, and corals. IV. Platyhelminthes, or flat worms. V. Nematelminthes, including Nematodes, the round or thread worms. VI. Trochelminthes, including rotifers. VII. Molluscoida, including corallines and certain shell-A. VIII. Echinodermata, including star-fishes and sea-urchins. IX. Annelida, including earth-worms. X. Arthropoda, including crustaceans, insects, and spiders. XI. Mollusca, shell-fish, and cuttle-fish.

**B. Vertebrates.** XII. Chordata, including A. possessing a structure called the notochord, a cord of cells along the middle line on the dorsal side of the enteric cavity, developing into the backbone in vertebrata. It is an extensive and important group, including fishes (Pisces), amphibians (Amphibia), reptiles (Reptilia), birds (Aves), and mammals (Mammalia). The Tunicata (e.g. sea-squirts) and amphioxus or lancelet

possess a notochord, and are simple forms of chordates, resembling in some respects the ancestral Vertebrate. (See AMPHIOXUS.)

**Animals, Cruelty to.** It was not until the beginning of the nineteenth century that any measures were taken either for the prevention or for the punishment of C. to A. England took the lead, and founded the Royal Society for the Prevention of C. to A., 1824, and Scotland followed in 1839. Later the U.S.A., France, and Germany had organisations for the prevention of C. to A. The various statutes on the subject were consolidated in the Protection of Animals Act, 1911. All domestic animals come within the statutory provisions and also wild animals if in captivity or confinement, or maimed, pinioned, or subjected to any contrivance for the purpose of preventing their escape from captivity. The Act of 1911 re-enacts the general provisions of the old Acts by which animals may not be ill-treated, over-driven, or kept without proper food and water. It is also forbidden to perform painful experiments on living animals except under licence from the Home Office and then only in accordance with statutory regulations. An application for such licence and a certificate for any exception from the regulations must be signed by the president of certain scientific bodies such as the Royal College of Physicians and Surgeons. By the Animals (Anæsthetics) Act, 1919, anæsthetics must be used for certain specified operations on horses, dogs, cats, and bovines. Besides the more obvious forms of cruelty, it is also forbidden to convey any animal in such manner as to cause it unnecessary suffering; or to administer poisonous or injurious drugs or to perform an operation without due care and humanity, while bull-baiting, bear-baiting, and cock-fighting have long been prohibited. The Act also regulates the business of knackers and licensed slaughterers. Other offences are selling poisoned grain or flesh for animal food and using dogs for draught; while the exhibition and training of performing animals are regulated by the Performing Animals (Regulation) Act, 1925, which provides for the registration with a local authority of persons so training or exhibiting animals. People convicted of C. to A. may, under the Act of 1933, be prohibited from keeping animals. Under the Protection of Animals Act, 1934, certain public contests, exhibitions, and performances in which animals are used are prohibited. These include throwing or casting with ropes or other appliances, any unbroken horse or untrained bull; or wrestling, fighting, or struggling with an untrained bull; or riding or trying to ride a horse or bull which, by appliances or treatment involving cruelty, has been stimulated to make it buck. On a conviction under the Act of 1911 the court may order the destruction of any animal if satisfied that it would be cruel to keep it alive,

or deprive the offender of its ownership. Compensation up to £10 may be awarded for any damage or injury to the animal or any person or property. A constable may, on getting a veterinary certificate, cause an injured animal to be slaughtered. The enforcement of the statutory provisions relating to C. to A. is mainly undertaken by the Royal Society for the Prevention of C. to A. with the assistance of the police. A number of homes for stray dogs and cats have been founded in Great Britain and in the U.S.A. See also VIVISECTION.

**Animé**, a term applied to various oleo-resins, sometimes to a variety of copal, but most frequently to elemi. Brazilian A. is the product of a leguminous tree called *Hymenæa courbaril*.

**Animism** (Lat. *anima*, soul) was a term first used by the Ger. chemist Stahl in the early eighteenth century to denote the doctrine that all the phenomena peculiar to the animal world are produced by an immaterial 'soul' or vital principle distinct from matter. Dr. Tylor, however, in his *Primitive Culture*, 1871, used the word to denote the attribution of a living soul to inanimate objects and natural phenomena. The use of the term is that now generally employed, but it is often loosely applied to the general belief in the existence of a soul or spirit apart from matter; in a word, to the belief in spiritualism and a spirit world as opposed to materialism. The phenomena of death, sleep, dreams, hallucinations, sickness, shadows, etc., seem from the first to have exercised the minds of savage races. The body of a man after death was in form the same as before. What was the difference? Something had evidently departed. Similarly in sleep, some immaterial part of him seemed to depart and make voyages in lands he knew not. The two phenomena combined would inevitably lead to a belief that at death the soul of the dead merely went on another journey, and this idea would be strengthened by appearances in dreams and by the imagined appearance of ghosts. The action of the departed soul might be variously described. Some races taught the transmigration of souls: that they took new bodies, either human or animal, after each death. Some taught that the soul then set out on a laborious journey to the land of the blest, or else was doomed to wander in the neighbourhood it had occupied in life. Almost all races have held that the relation between living and departed is not broken, and also that the souls become by death more powerful both for good and for evil. The spirits can be propitiated and pleased by offerings of food, drink, and goods. Sometimes they remain near the earth to take vengeance for death or injuries done them. They can also be controlled by magic; hence the speedy rise of the sorcerer and medicine-man. Since fear is the chief emotion in the savage, it follows that evil spirits receive more attention than good ones, and so the influence of simple

A. has generally a bad effect. The theory of moral retribution hardly exists. In one way, however, it may do, and this case is connected with the development of ancestor-worship (q.v.). Death did not change the character of the soul; a man went on doing the same kind of thing after it as before. The souls of ancestors, then, would be considered as watching over and protecting their descendants. The departed chief would still have the care of his tribe. Since, in the primitive state, every stranger is an enemy, almost all other spirits would be malignant. Here also arises the idea of moral retribution, for if in his lifetime the chief, the ancestor, had dispensed rewards and punishments to his inferiors, would he not continue to do so? By gradually working backwards, tribes practising ancestor-worship have sometimes come to the idea of a first source, the spirit of the first ancestor, lord of the dead, and supreme ruler and even creator. The soul has been conceived of in various ways, the material and the spiritual curiously blended. Anct. tradition in Europe and other countries has associated it with the breath. The Rom. custom of sucking in the breath of a dying person may thus have arisen. Other peoples connected the soul with the shadow; it will be remembered that Dante gives the dead none.

But primitive man makes no distinction between man and the lower animals. Animal worship (q.v.) would lead one to think he often conceives of them as greater than himself. Animals, too, appear in dreams; so they are given souls. Indeed, the worship of animals may have arisen from this principle. Dead animals are credited with a knowledge of how their remains are treated, and even with the power of taking vengeance on their slayers. But the idea is carried still further. In sickness strange spirits enter a man; they can change their abode, and are not the spirits of disembodied ancestors. The abode of these is fixed in natural and material objects. Hence on the one hand arises fetishism, and, on the other, nature religion, and, ultimately, polytheism. Fetishism is by far the lower form, the spirit often being compelled by force of magic to remain with the fetish. The conception of natural objects as possessing spirits soon develops by separating the spirit from the object—by setting the spirit free, in fact; just as in animal worship the animal tends more and more to become a mere symbol of the spirit. Similarly, the spirit which was at first contained in the corn, the tree, the riv., becomes in time the presiding genius of the crops, the forest, etc.

Dr. Tylor postulates A. as the first requirement of religion, stating that nothing below this should be considered as religion. Strictly speaking, pure A. is not religion, but rather philosophy. It shows no form of emotion, but is a form of explanation of given pheno-

mena. As we have said, the term is commonly used as above. A. is composed of simple elements. In later developments of religion some survivals generally remain of earlier superstitions which are quite irreconcilable with the later teaching. Not so with A.; rather are traces of its crude developments found in the earlier religions. Even in Christian and civilised countries fetishism (exemplified by the belief in charms, mascots, and lucky coins), magic (shown by the use of incantations, charms, and the faith in omens), etc., still have strong influence in many quarters. The nature religion has been taken up and explained by Christianity in the doctrine of the divine immanence, and is held in another form by various schools of nature worshippers. See E. B. Tylor, *Primitive Culture*, 1871; R. M. Dorman, *The Origin of Primitive Superstitions*, 1881; Sir James Frazer, *Golden Bough*, 1890-1915; R. R. Marett, *The Threshold of Religion*, 1914; G. F. Stout, *Mind and Matter*, 1931.

Animuccia, Giovanni (c. 1500-71), It. musician and composer. In 1553 he was appointed *maestro di capella* at the Vatican. His hymns, *Laudi Spirituali*, are said to be the origin of the oratorio. He composed a number of masses, motets, magnificats, madrigals, and other pieces.

Anio (modern Aniene or Teverone), a trib. of the Tiber, in central Italy, which, after a course of 70 m., passing Tivoli, joins the main stream 3 m. above Rome. Since the third century its aqueducts have supplied Rome with water.

Anions, the negatively charged particles in a dissolved or liquid electrolyte. On electrolysis they pass to the positive electrode or anode, where they are discharged. The positively charged particles are known as *cations* or *kations*.

Anise, or *Pimpinella anisum*, is a species of the Umbelliferae found in the S. of Europe. The fruit is known as aniseed, and is much used in flavouring.

Anjar, tn. of India in Cutch, 10 m. from gulf. Pop. 13,000.

Anjou, an old prov. of France, now covered by the dept. of Maine-et-Loire, and parts of those of Indre-et-Loire, Sarthe, and Mayenne. In Rom. times it was the ter. of the Andecavi, whence the name of Angers, the anct. cap., is derived. The son of Geoffrey V. of Anjou by Matilda, daughter of Henry I. of England, came to the Eng. throne as Henry II., and thus founded the Angevin line of kings. In 1204 Philip Augustus of France took it from King John. It was later bestowed as a fief upon Charles, the son of Louis VIII., who, conquering Naples and Sicily, became there the founder of the Angevin line. Charles was also count of Provence, and for nearly half a century the two were united. Margaret, daughter of Charles II. of Naples, took A. with her as part of her dowry to Charles of Valois. In 1328, on the accession of her son, Philip VI. of France, it was joined to the Fr. crown. In 1360



it was made a duchy, and with Louis I. returned to the dominion of Naples. In 1480 A. was finally annexed to the Fr. crown, and the title of duke of A. became an honorary title given to princes of the royal family of France.

Anjouan, see JOHANNA.

Ankara, or Angora, a tn. in Asia Minor and cap. of the vilayet of the same name and, since 1923, of Turkey and headquarters of the Republican Gov. The city was a poor substitute for Constantinople, being poorly laid out and of primitive sanitation. Kemal Atatürk planned a new city on the Amer. system and, by the time he d., many modern improvements had been carried out. Its ant. name was Ancyra, and it was the cap. of the Rom. prov. of Galatia Prima. A marble temple, now in ruins, contains the *Marmor Ancyranum*, inscribed with a record of the reign of Augustus Caesar. It is just over 200 m. E.S.E. of Constantinople. It was the scene of a great battle in 1402 between the Turks and the Tatars, when the former were defeated. It is famous for its breed of goats, which have long, silky hair and are very valuable. This hair is known as mohair in its manufactured state. Pop. of vilayet 535,000; of tn. 157,000.

Anker, a measure of wine and spirits, containing about 10 wine gallons, formerly used in England. It was borrowed from the Dutch, and is still used in Holland, Denmark, Sweden, etc. The name is also given to a cask containing an A.

Ankerite, a rhomboidal crystal, yellowish-white, translucent, and vitreous in lustre. It consists of magnesite, 25.7; carbonate of iron, 20.0; carbonate of manganese, 3.0 = 99.8. It is closely related to the dolomites.

Ankh, in Egyptian art, a symbol of enduring life and of the regenerative energies.

Anking, see HWAISING.

Anklam, a tn. of Germany, prov. of Pomerania, on the R. Peene, 4 m. from its outlet in the Kleine Haft. It has iron foundries, and manufs. soap and sugar, while its medieval buildings are of some interest.

Ankle, the joint between the leg and the foot. It is a hinge joint with backward and forward motion, although a certain amount of lateral motion is possible. There are 3 ligaments, the anterior, internal, and external. As the A. is the joint which most often has to bear the whole weight of the body with the greatest amount of leverage, sprains are a common occurrence. Hot fomentations should be applied if the swelling is considerable, and not too severe bandaging resorted to. Complete rest for the joint is the first desideratum, after which gentle massage should be employed. Passive movements of the muscles should precede any effort to move the joint by the muscles alone, and exercises gradually proceeded with until the weight of the body can be endured.

Ankober, or Ankobar, tn. of Abyssinia, in Shoa, situated about 8500 ft.

above the sea, in lat. 9° 34' N. and long. 39° 54' E. It contains a royal palace, the climate is good, and the pop. was once considerable. It is now about 3000.

Ankole, or Ankori, dist. in the Uganda Protectorate, Brit. E. Africa, bordering on Lake Edward.

Ankylosis (Gk. ἀγκύλος, curved), the immovable union of 2 bones naturally connected to form a movable joint, caused by an osseous growth in *true ankylosis*, by a fibrous growth in *false ankylosis*. It is liable to occur after a fracture in the neighbourhood of the joint, but the condition also occurs normally in the growth of the human body, as when certain of the vertebrae in the spinal column of a child become fused as it proceeds to adolescence and adulthood. Because of the rigid position of the limb, A. naturally attacks the Indian fakirs, whose religious devotion condemns them to remain motionless for years. Cases are on record of a general A. of all the bones of the human body. Remedial measures include excision of the joint and the use of electrolysis, a solution of sodium chloride being the electrolyte employed.

Ankylostomiasis, or Uncinariasis, the morbid condition produced by the presence of the parasite *Ankylostoma duodenale* (hook-worm) in the human intestine. The parasite is found in tropical countries, and is also known in Germany, Belgium, Switzerland, England, and the S.E. section of the U.S.A. The disease is most common amongst brickmakers, tunnel-workers, and miners. The eggs of the parasite are expelled from the intestine with the faeces, and develop in warm, damp soil into larvae which can infect new hosts by boring through the skin, usually of the foot. The larvae are taken in the blood to the lungs, whence they are coughed up into the mouth and then swallowed. In the stomach and intestine they become the mature hook-worms, 1-2 cm. long, which attach themselves by their hooks to the mucous membrane, producing internal hemorrhage, often fatal; milder attacks cause anaemia and vomiting. Moreover it is impossible for infected individuals to lead a normal, active existence, and attacks of the parasite were responsible for such epithets as 'poor white trash,' formerly applied to dwellers in the S. U.S.A. Vermifuges and purgatives remove the worm from the intestine; carbon tetrachloride is much used nowadays, and is extremely effective. Infection can be prevented by the wearing of leather footwear and faeces should be properly disposed of by adequate sanitation. The disease may also be spread by the practice in many countries of using human manure for the growing of crop plants.

Ann, or Annat, in Scottish law, is the half year's stipend payable for the vacant half year after the death of a minister to his family or next of kin. As it belongs to his next of kin, and not to the minister himself, it is not assignable by him, nor can it be attached for his debts.

**Anna**, an Indian coin, value about 12., the sixteenth part of a rupee.

**Anna Carlovna, Leopoldovna**, or **Anne of Russia** (1718-46), Russian princess, and regent for her son Ivan, 1740-41, was the wife of Anton Ulrich, duke of Brunswick. The Empress Anna Ivanovna, her aunt, left the throne to Ivan, but after a year's reign the infant emperor was murdered. The regent-mother and her husband were thrown into prison, where Anna d. in 1746 and Anton in 1776.

**Anna Comnena**, daughter of the Emperor Alexius I. (Comnenus), b. in the year 1083, and famous as being probably the first woman historian. She was carefully trained in the learning of the time by her father, whose favourite she was. Having unsuccessfully attempted, first by means of influence over her father and secondly by means of conspiracy, to obtain the crown for her husband, she retired to a convent, where she wrote her hist. called the *Alexiad*. It consisted chiefly of a panegyric of her father's reign.

**Anna Ivanovna** (1693-1740), second daughter of Ivan V., brother of Peter the Great. Her girlhood was spent in the vicinity of Moscow, and she was married at an early age to Frederick William, duke of Courland. He d. soon after the marriage. In 1730, being offered the crown of Russia, she accepted, signing articles which limited her power, but which she soon repudiated. She and her lover, Biron, ruled Russia sternly and well, but gradually their rule became very unpopular. During her reign was fought the war of the Polish succession, and later a Crimean war.

**Annaberg**, tn. of Saxony, Germany, in the Erzgebirge range, 18 m. S.E. of Chemnitz. It is situated over 1800 ft. above the sea in a mining dist., and has lace and button manufs. Pop. 20,000.

**Annabon**, or **Annobon**, Sp. is., gulf of Guinea, W. Africa, 4 m. long, 2 m. wide. It is mountainous (3000 ft.), and has a pop. numbering between 2000 and 3000. On it is situated the town of San Antonio de Praia.

**Annab**, see ANAH.

**Annals** were formerly records of events (in chronological order) which happened during the year, and the Chinese, Assyrians, Egyptians, Gks., and Romans had their A. According to Cicero (*De Oratore*, xii.), it was the custom from the commencement of the Rom. state down to the time of Publius Murius for the pontifex maximus to draw up an account of the transactions of the past year to be publicly exhibited. These A. were afterwards called *Annales Maximi*, the Great A., and it is probable that they were the same as those referred to by Livy as *commentarii pontificum*. *Annales Gentium* and *Annales Consulares* were written by such men as C. Calpurnius Piso, consul, 67 B.C., which contained the hist. of Rome in chronological order. Later

the term A. was given to any historical work written in chronological order, e.g. the A. of Tacitus; and now it is frequently used of an account of events digested into so many successive years, as the *Eccles. A.* of Baronius and the *A. of Scotland* by Sir David Dalrymple, or of a periodic publication containing records of discoveries, transactions of societies, as the *A. of Science*.

**Annam**, until 1946 a protectorate of Fr. Indo-China; now part of the republic of Viet-Nam. Though the term is sometimes used to cover the whole of



Paul Popper

#### ANNAMESE FISHERMAN

Fr. Indo-China, and sometimes to include Tongking, A. proper extends from Cochín-China on the S. to Tongking on the N., and from Siam and Cambodia on the W. to the sea on the E. The area is about 52,000 sq. m., and the soil in the interior is fertile. A range of mts. runs the length of the country on the E. On the W. is the basin of the Mekong, which is the only considerable riv. Short coast rivs. unfit for navigation are common. The productions of A. include the usual Asiatic cereals and fruits, cinnamon bark, cotton, sugar, silk, tea, coffee, tobacco, and areca nut, and various valuable kinds of timber. As the mulberry is indigenous, silkworm-rearing is an old-established industry. There are about 11 sq. m. of mulberry-tree plantations and much silk was exported. There is a coal-field. The exports (before the Second World War) were sugar, rice, cotton and silk tissues, cinnamon, tea, and paper. There is also some coastal fishing. The trade was almost entirely in Chinese

hands. Binh Dinh, with 70,000 people, is the largest tn. The cap. is Hué, and the chief ports are Turun, Quinhon and Xuan-dai. These were open to European commerce, though entirely under Fr. influence. The Annamese proper are found chiefly in the tns. and on the coast. They are of Mongolian race, though they show different characteristics from the Chinese, whose influence over them has been considerable, and with whom they have intermixed. They are lazy and pleasure-loving, and generally in a state of ignorance. Their chief physical peculiarity is a strange swaggering walk, said to be due to a peculiar conformation of the pelvis and femur and an extra widening of the space between the big toe of each foot and the others. In the mountainous interior are to be found various tribes of Mois, indigenous to the country. These are unmixed with Chinese blood. As in all the group of which the Chinese are the chief, the language is mainly monosyllabic, and it further contains a large admixture of Chinese words. The characters in use for writing are also a modification of the Chinese. The religion, borrowed, as is all the rest of the culture, from China, is chiefly Buddhism. There are some 420,000 Rom. Catholics. Extreme reverence is shown to the dead, and ancestor-worship is in great vogue.

In the third century A. was conquered by the Chinese, who ruled the country vigorously till the middle of the tenth century. At this time it became self-governing, though China still retained its suzerainty. About 1400, however, a great war began, which ended in 1428 with the recognition of A.'s independence. In the middle of the eighteenth century the king of Cochinchina made a treaty with France in return for aid, and thus introduced Fr. influence. In 1858 the execution in A. of a Fr. subject gave cause for a war, and a Fr. squadron stormed Turane and Saigon. France, in 1867, took possession of Cochinchina, following this up in 1882 by taking the protectorate of Tongking. By a treaty of 1884 the Fr. protectorate was estab. in A. Theoretically, A. was a monarchy of the most despotic kind, but the power was vested entirely with the Fr. resident superior, who, with troops at his disposal, resided at Hué. The local gov. was mainly in the hands of native officials, but the army officers were Fr. Bao-Dai succeeded to the throne in 1925, the gov. during his minority being carried on by a regency Council. A popular representative chamber was estab. in 1926. Soon, however, A. was lost to the Fr. when the Jap. invaded Fr. Indo-China in the Second World War (see under INDO-CHINA, FRENCH). In Mar. 1945 there was an abortive Fr. resistance rising, and the Annamese swept down to the neighbourhood of Saigon and proclaimed an Indo-China republic. Great Britain became involved in this quarrel, which soon be-

came a serious matter, and the 20th Indian Div. was drafted in. The Annamese, despite the fact that the Fr. have done much in the way of health services and education, have always been sullenly resentful of Fr. rule, although oddly enough they have absorbed much more Fr. culture than the Cambodians, who are more akin to the Siamese. In Sept., however, the revolt died down, and A. reverted to Fr. rule. In view of the strong nationalist movement, however, the Fr. Gov. was compelled, like the Dutch Gov. in Java, substantially to modify their colonial policy. In order to satisfy the aspirations of the patriotic movement known as Viet Minh, they agreed, in 1946, to the establishment of a new republic, comprising A., Tongking, and Cochinchina. Pop. 5,600,000. See also VIETNAM. See F. Jammes *Au pays Annamite* (Paris), 1898, and *Souvenirs du pays d'Annam* (Paris), 1900; De Lanessan, *L'Empire d'Annam* (Paris), 1898; Sombsthav, *Annam et Tonkin* (Paris), 1898; V. Thompson, *French Indo-China*, 1937.

**Annamaboo**, or **Annamaboo**, a tn. with a Brit. fort on the Gold Coast, 10 m. E. of Cape Coast Castle, W. Africa. It is a strong fort, and has a good breakwater. Pop. 5000.

**Annamuka**, or **Homuka**, the native name of New Rotterdam, one of the Tonga Is.

**Annan**, an anct. Scottish tn. and parli. bor. in Dumfriesshire, on a riv. of the same name, 17½ m. from Carlisle. It has cotton and rope manufs. With Dumfries it sends 1 member to Parliament. Pop. 6300.

**Annapolis**, cap. of Maryland, U.S.A., port of entry and co. seat of Arundel co., Maryland, on the Severn R., 26 m. S.E. of Baltimore. It is on the A., Washington, and Baltimore, and Baltimore and A. Short Line railways. The U.S. Naval Academy was founded here in 1845. The students, formerly called cadets, are now called midshipmen. Two are allowed for each senator, representative, and delegate in Congress, 2 for the dist. of Columbia, and 3 each year for the U.S.A. at large. After a course of 4 years the midshipmen go up for examination, and those who pass are appointed in the lower line of the navy. Chief industry oyster tinning. Pop. 13,000.

**Annapolis Royal**, port of entry of Nova Scotia, Canada, co. seat of A. co. The oldest settlement in Canada, founded by the Fr. in 1604 under the name of Port Royal. A. Valley is famed for its extensive fruit cultivation. Exports apples, fish, and lumber. Pop. 1000.

**Ann Arbor**, a city of Michigan 38 m. W. of Detroit, has manufs. and is seat of the univ. of Michigan. Pop. 29,815.

**Annat**, see ANN.

**Annotes**, see FIRST-FRUIT.

**Anne**, queen of Great Britain and Ireland (1702-14), was b. on Feb. 6, 1665. She was the second daughter of James II. (of England, but James VII. of Scotland). When she was 6

years old her mother died. Although her father had professed his adherence to the Catholic Church, A. was educated in accordance with the ideas of the Anglican Church. She married, in 1683, Prince George of Denmark, who possessed little inclination for the active work demanded of those interested in public affairs, and much less ability. Soon after her marriage, Lady Churchill, wife of Colonel (Lord) Churchill (afterwards duke of Marlborough), was appointed to the position of lady of the queen's bedchamber. Needing support, the queen made Lady Churchill her intimate friend and confidante. How Lady Churchill used that favour to the advancement of her husband's interests and the furtherance of her own personal desires all the world knows. While her father reigned A. lived a life of seclusion, the glamour of court life holding no attractions for her, but as soon as William of Orange had landed, she hurried to his side. On his death she succeeded to the throne. Although A. bore 17 children only 1 survived infancy, and he, Philip, *d.* in his twelfth year. Colonel Churchill (now the duke of Marlborough) and his wife secured a great amount of influence over A., and she was involved with the Churchills in not a few intrigues concerning the return of her father and Jacobitism. In her reign the beginnings of party gov. are noticed. Intense and bitter contention characterised the attitude of one party to the other, and the queen, by the constant determination she showed in securing the throne to her brother James, the elder pretender, made matters worse. She possessed few ideas concerning constitutional gov. Such as they were opposed the atmosphere of political and religious freedom. The Marlboroughs now abandoned the cause of James II. This disappointment, together with the constant bickering between and even among the different parties, gave A. a considerable amount of trouble. A breach developed between the queen and her one-time favourite, the duchess of Marlborough. Spoiled by her brilliant position, the duchess trespassed with too great a degree of arrogance upon her privileges. A quarrel ensued, and they parted, never to be reconciled. Mrs. Masham succeeded the duchess as confidante of Queen A., and it can be traced chiefly to her influence that the Whig ministry collapsed, 1710. Their leader was Godolphin, a determined supporter of the Jacobites. Harley (afterwards earl of Oxford) and St. John (Lord Bolingbroke) led the new ministry. Dissensions among them caused a still greater delay in the prosecution of A.'s plans. She now wished to assure the success of her brother's accession at all costs, but want of uniformity in the House made the project impossible of execution. In 1714, bitterly disappointed at the failure of her fond hopes, A. died. She was succeeded by the elector of Hanover, George I.

Among the notable events of her reign, most of which are treated separately, mention must be made of (1) the Act of Union, 1707, which united the parliaments of England and Scotland; (2) the war of the Spanish succession, 1702-13, the chief events of which were the battles of Blenheim (1704), Ramillies (1706), Oudenarde (1708), Malplaquet (1709), and the capture of Gibraltar (1704). The war was ended by the treaty of Utrecht, 1713.

**Anne of Austria** (1601-66), eldest daughter of King Philip III. of Spain; she married in 1615 Louis XIII. of France. Owing to the influence of Richelieu this marriage was one long estrangement. On the death of Louis XIII. she became regent for the young king, Louis XIV., adopting as her minister Mazarin. That she was deeply under the influence of this minister can be proved, but we have no conclusive evidence of their marriage. On his death in 1661 she retired to a convent, where she *d.*

**Anne of Cleves** (1515-57), a Ger. and Lutheran princess. Married as a fourth wife to Henry VIII. in Jan. 1540. This marriage proved unsuccessful, owing to the plain looks and dullness of the princess herself. She, however, was quite satisfied to be divorced (June 1540), and received a pension. Her marriage, arranged by Thomas Cromwell, was the immediate cause of his downfall and death, 1540.

**Anne of Denmark** (1574-1619), daughter of Frederick II. of Denmark and Norway, and wife of James I. of England and VI. of Scotland. Married in 1589 to James in spite of the opposition of Queen Elizabeth. Showed tendencies towards Catholicism, and probably for that reason was deprived of the education of the young Prince Henry. Was very extravagant and vain, but very highly esteemed by the king.

**Anne of England** (1456-85), daughter of the earl of Warwick (the king-maker). She was betrothed to Edward, Prince of Wales, but after his death at Tewkesbury in 1471 was compelled by Richard of Gloucester to marry him in 1473. In 1483, when he usurped the crown, she became queen.

**Anne Hathaway's Cottage**, at Shottery, 1 m. from Stratford-on-Avon. It is a thatched farmstead, the undisturbed bp. of A., wife of the poet. Contains curious Tudor and Jacobean furniture. National property controlled by the bp. trustees.

**Annealing**, a process to which glass and metals are subjected, which consists in heating and subsequent gradual cooling. On the other hand, tempering consists in heating a metal and then suddenly cooling it. The result of A. is to make the material ductile and tough, whilst the result of tempering is to make it hard and brittle. The ultimate condition is probably brought about by a certain arrangement of the crystals or fibres of the material, accompanied by a degree of occlusion of gas. Glass,

before it is annealed, is excessively brittle, so that a hard body like a small stone dropped into an unannealed glass vessel shivers it to pieces. For purposes where metals have to undergo any strain they have to be annealed, that is, cooled more slowly than in ordinary air, while they are being worked, or afterwards. It is found, too, that pieces of metal, such as the links of a chain, undergo changes in their molecular arrangement with lapse of time, so that it is no uncommon thing for a chain to be re-annealed after it has been in use for some time.

**Annecy**, cap. tn. of dept. of Haute-Savoie, France. It is situated at the N. end of the Lake of A., in a beautiful country, and contains interesting buildings. Pop. 23,000.

**Annelida** (Lat. *annellus*, little ring), a phylum of animals differing little from the Arthropoda and the Mollusca. It consists of segmented worms most of which bear minute spines or setæ by which locomotion is assisted; the blood is usually red, and the perivisceral cavity is part of the celome. The arthropods differ from them in the last particular, and the molluscs are unsegmented. Usually the A. are aquatic, but in some cases they are terrestrial (earth-worms); some species are hermaphrodite. There is a vascular system in most As., the nervous system consists of ganglia; respiration is often effected by means of gills; the alimentary system contains a tubular canal opening in the first segment as the mouth, and in another as the anus. Reproduction may take place sexually or asexually by budding; in many instances, if a worm is cut in two each part will produce the missing segments. These animals generally hide themselves by means of burrowing, but some may form round themselves a dwelling made of exudates from their bodies and accumulated external material. The As. include earth-worms, lob-worms, blood-worms, and leeches.

**Annexation**, the term applied in international law to the act by which a nation adds to its territory lands previously independent or in the possession of another state. It may be the result of conquest, of voluntary cession, or of mere occupation of a previously unoccupied or uncivilised district. Often, again, it is the sequel to the establishment of a protectorate. Acquisition of territory by purchase or lease, as a bilateral action, is not spoken of as A., except in case of cession, must always be supported with an armed force sufficiently large to carry the proclamation into effect; otherwise it is purely fictitious. For example, in Sept. 1900 Lord Roberts proclaimed at Pretoria that Great Britain had annexed the territory of the Transvaal republic. Yet the war continued for another 2 years.

The annexing state takes over all the territory annexed, with its obligations and benefits, provided they be not contrary to the new order. Laws previously

passed are, of course, no longer binding. Questions of detail are perpetually being settled in the courts of various nations, and recourse should be had to these cases for fuller information as to the practice of individual states.

**Anniston**, co. seat of Calhoun co., Alabama, U.S.A., among the Blue Ridge Mts., 63 m. N.E. of Birmingham. It is a centre of the cotton trade, and has large manufs. of all kinds of ironwork and machinery. It is the seat of the Alabama Presbyterian College. Founded in 1873. Pop. 22,000.

**Anniversary** (Lat. *anniversarium*, from *annus*, year, and *vertere*, *versum*, to turn) is a term used to express the yearly return of any remarkable day. As. of religious festivals, of the commemoration of great events in hist., and of birthdays in domestic life are kept. The Christians keep Christmas Day, Good Friday, Easter, and Whitsun in commemoration of the great events in the life of Christ. The king's birthday is officially kept on June 12.

**Anno Bom**, Annobon, or Annabon, is a small volcanic is. in the bight of Biafra, in the E. part of the gulf of Guinea. It was discovered by the Portuguese in 1483, and was ceded to Spain in 1778. Pop. 2,500.

**Annonay**, tn. of Ardèche, France. It manufs. leather (for gloves), paper, etc. Pop. about 15,000.

**Annotto**, Anatta, Anatto, a dyestuff from the *Bixaorellana*.

**Annual Register**, pub. yearly, a record of contemporary events. It was started in 1753 by Dodsley the bookseller. It is now pub. by Messrs. Longmans, and contains information on literature, art, science, and events of the current year.

**Annals**, a class of books sumptuously produced with splendid engravings very popular during the first half of the nineteenth century. They were particularly in vogue as Christmas, New Year, and birthday presents. The succession was commenced in 1823 by the *Forget-me-not*, followed in the next year by *Friendship's Offering* and the *Literary Souvenir*. Other successors were the *Keepsake*, ed. by Lady Wortley and later by the Countess of Blessington, who also ed. the *Book of Beauty*. The *Gift* and the *Token* were Amor. productions. About 1840 their popularity declined rapidly. The *Forget-me-not* continued for the unparalleled length of 22 years. The *Book of Beauty* and the *Keepsake* survived it till 1856. The name, though not the genus, remains in the present Christmas A.

**Annuity**, a term applied to a sum of money which is paid yearly, or at certain periods of each year. The most general application of the term is in the case of what are otherwise called *life As.*, that is, where a certain sum is paid per annum until the death of a stated person. *As. certain* are not dependent upon any contingency, and may be *terminable*, in which case the payments continue until a stated date, or *perpetual*,

where the payments are presumably for ever. When the first payment has to be made at the time of the transaction, it is called an *A. due*, but when payment has not to commence until a stated date, it is called a *deferred A.*

The Gov. uses the principle of terminable *As.* to discharge certain obligations within a given time, with a view to limiting in some degree the burdens placed on posterity by the national debt. Such *As.* may be held by private persons, and are exchanged either for cash or for gov. stock, which is cancelled when the *As.* are taken up. The Gov. may also make an arrangement with itself, as it were, as a banking concern, to make payments to include a proportion of the cap. as well as the interest of gov. stock, as in the 'Old Sinking Fund.' The value of such an arrangement is that it can be varied upon an emergency, although, for obvious reasons, such a proceeding is usually avoided if possible. Instances of perpetual *As.* are provided by the various irredeemable gov. stocks, where the security is practically absolute. In calculating the present value of an *A.* certain, or the yearly amount for a certain purchase value, the interest reckoned is compound. Methods of calculation are to be found in any text-book of algebra. See also PUBLIC DEBT.

Life *As.* present some more complicated features than *As.* certain, because the probability of the contingency becoming actual enters into the calculation. Hence the importance of tables of mortality, etc., for insurance companies and others who deal with *As.* The tendency in early times was to use very simple rules for the probability of death, which were generally very inaccurate for extreme cases. Thus the rule in Rome up to A.D. 230 was to reckon for all ages under 30 an *A.* was worth 30 years' purchase, and for every additional year of age 1 year was taken off the purchase value. Thus the purchase value actually vanished at 60 years of age. In 1725 Abraham Demolive enunciated the rule that out of 80 children born 1 would die every year until the last one died between the ages of 85 and 86. This was found to fit in approximately with observed facts, but continual improvements have since been made. Perhaps the same conclusion had been arrived at in 1671 by Hudde, in a correspondence with Jan de Witt, grand pensionary of Holland. In 1693, Halley, the famous astronomer, worked out the probability of death for every fifth year from the records of birth and deaths in the city of Breslau, and computed the purchase value of *As.* at 6 per cent interest, this being probably the first attempt to arrive at values on a scientific basis. Shortly afterwards the Eng. Gov. attempted to raise money by the sale of *As.* at 14 per cent., that is to say, at about 7 years' purchase. Notwithstanding the pub. tables of Halley, which showed that such *As.* were worth from 17 years' purchase at age 10 to 4½ years'

purchase at age 75, the proposal was by no means eagerly accepted by the investing public. In 1808 the Northampton table was adopted by the Gov., based on statistics of the deaths in Northampton between 1735 and 1780. *As.* were offered on the lives of nominees, this time based on age with no distinction of sex, but at much too favourable a rate. Again little business was done except by Dutchmen, who were more conversant with the subject and chose their lives carefully, but the loss on such transactions increased until it amounted to as much as £8000 a week. The next scheme was much more scientifically constructed, but included *As.* for men of 90 years of age at 62 per cent or less than 2 years' purchase. This provided an opportunity for speculators who nominated all the healthy old men they could lay their hands on and reaped a rich harvest. Thenceforward *As.* on aged lives were not offered, and some time afterwards it was enacted that no one could nominate a life over 65 unless the nominee had a direct interest in the *A.*

Naturally such experiences and the gradual accumulation of reliable statistics have enabled the Gov. to ascertain what rates are profitable. The Gov. tables, however, are based on the assumption of a 2½ per cent interest, whereas many insurance companies can afford to allow for at least 3 or 3½ per cent interest. The tables in general use by the prin. insurance offices are those prepared by the Institute of Actuaries, and are distinguished by the symbols *HM*, *HP*, *HMF* and *DMF*, representing healthy male lives, healthy females, healthy males and females, and diseased males and females. Examples of such tables are appended.

TABLE I. *HM*

Showing the value of an *A.* of £1 at certain ages.

Age next Birth-day.	Value of an <i>A.</i> of £1.	Age next Birth-day.	Value of an <i>A.</i> of £1.
20	£20 043	50	£13 896
25	21 038	55	12 094
30	19 867	60	10 236
35	18 587	65	8 418
40	17 176	70	6 657
45	15 594	75	5 061

TABLE II.

Approximate *As.* for a purchase price of £100.

Age next Birth-day.	<i>A.</i> for £100 Males.	<i>A.</i> for £100 Females.
40	46 0 4	45 5 6
45	6 9 10	5 14 0
50	7 1 2	6 8 0
55	8 0 10	7 5 6
60	9 0 4	8 1 0
65	10 13 4	9 7 10
70	12 19 2	11 8 6

**Annulus**, in geometry, the name of the space or ring enclosed between the circumferences of 2 concentric circles.

**Annunciation**, the announcement made to the Virgin Mary by the angel Gabriel of Christ's Incarnation. The Feast of the A. (commonly known in England as Lady Day) was instituted in memory of this fact. It is kept throughout the Church on Mar. 25. The highest lit. order of the knighthood is that of the A. The subject has frequently been treated in sacred art.

**Annunzio**, *see* D'ANNUNZIO.

**Annus Deliberandi**, the period allowed to an heir by Scots law to decide whether he will accept or reject the inheritance, including any debts or mortgages thereon. The period is 6 months, at the expiration of which time creditors may take action.

**Annus Mirabilis**, the title of a poem written in 1667 by John Dryden. The title, meaning 'The Wonderful Year,' refers to 1666, in which the Eng. were victorious in the war against the Dutch, and in which the great fire of London occurred.

**Anoa**, a species of ruminating quadruped apparently intermediate between the antelopes and the ox or bovine group. It is about the size of a sheep; is wild and fierce; and its horns are erect, straight, sharp, depressed anteriorly, and irregularly ranged at the base. It is found in large herds in the is. of Celebes.

**Anobium** is a genus of coleopterous insects. It consists of small beetles which live on organic matter. *A. panicum* is the biscuit weevil, and *A. striatum* the death-watch, which makes a curious tapping sound.

**Anode**, in electrolysis (*q.v.*), the electrode in connection with the positive pole of the battery. The direction of the current is from the A. through the liquid to the cathode.

**Anodynes**, or **Analgesics**, medicines which relieve pain by their action on the brain, or their influence over the conductivity of the sensory nerve fibre. The principal A. are opium, Indian hemp, belladonna, aconite, chloroform, antifebrin, antipyrine, etc. They should never be used except in accordance with the advice of a medical man. *Hoffman's A.* is a colourless liquid consisting of ether, alcohol, and ethereal oil; it is used in nervous irritation, angina pectoris, and asthma. *A. colloid* is an unofficial remedy used for painting over the course of nerves in neuralgia, sciatica, etc.

**Anointing**, *see* BAPTISM, CHRISM, CONUNCIATION, EXTREME UNCTION.

**Anolis**, a genus of lizards belonging to the Iguanian family (*see* Dumeril and Blinn's work on *Reptiles*, vol. iv, p. 85), and peculiar to America and the adjacent is. The structure of their toes enables them to traverse a smooth wall or ceiling, and to climb with great facility. They are slender, active, and for the most part of small size, and are mostly found in woods and rocky places.

They are timid and harmless, and when under the influence of fear they dilate the dewlap, and the skin especially of the throat changes its hues with great rapidity.

**Anomalistic Year**, the period of time between 2 successive passages of the earth through its perihelion, the point in its orbit when it approaches nearest the sun. This point is not fixed, and as a result the A. Y. is nearly 5 min. longer than the sidereal.

**Anomaluridae**, an African rodent closely allied to the flying squirrels, but forming a distinct genus (*Anomalurus*) by reason of the horny scales on the lower surface of the tail. These project from the skin and probably assist the animal in climbing trees. *Idiurus* is another genus of A.

**Anomaly** (Gk. *án-*, negative, *μαλός*, even), a variation from the ordinary rule. In astronomy the angle subtended at the centre of the sun by a planet in any part of its orbit and the perihelion it has passed. The *mean A.* is that which would be true if the body moved at a uniform rate throughout its course, the rate being calculated from the actual time taken.

**Anonaceæ**, an order of dicotyledonous plants consisting of tropical and sub-tropical trees and bushes. The flowers have a perianth in 3 whorls of 3, numerous hypogynous stamens, and numerous superior carpels, usually with many ovules. The genera *Anona* and *Arbutus* have edible fruits such as *Anona reticulata* or the custard apple, while the species *Uvaria aromatica* yields Ethiopian pepper.

**Anonymous** (Gk. *án-*, negative, *ώνυμα*, dialect, name), a writing or work of which the author is not named. The work is described as *pseudonymous* when an assumed name is used. Most of the works of art of antiquity which have come to us are A., and in past centuries many great writers have pub. their works in this form. Swift's *Tale of a Tub*, etc., and Goldsmith's *Citizen of the World*, may be cited as examples of works pub. thus, from the authors of which the veil has afterwards been withdrawn. The author of the *Imitation of Christ*, a book circulated throughout the world, is yet unknown. Most journalistic essays were until comparatively late years pub. anonymously, as concealment was felt to give greater freedom to the writer. It has frequently, however, been made a cover for little more than personal spite. Anonymity forms one of the greatest difficulties of bibliography. The titles of some 24,000 A. works are given in Barbier's *Dictionnaire des ouvrages anonymes et pseudonymes* (Paris, 4 vols. 3rd ed. 1872-79). A similar work of reference is Haikett and Laing's *Dictionary of Anonymous and Pseudonymous Literature*, 1926-31.

**Anopheles** (Gk. *án-*, without, *σάκκα*, use), a genus of mosquitoes, of the order Diptera and family Culicidae. *A. maculipennis*, a common Brit. species, is one of the distributors of malaria in tropical countries. *See also* ROSS, SIR RONALD.

**Anorthite**, a mineral of the feldspar group, consisting of calcium and aluminium silicate. The colour is white, grey, or red, and its hardness about 6. A. is a constituent of igneous rocks such as basalt and gabbro, but the most completely developed crystals are found in rocks ejected from Mt. Vesuvius.

**Anorthoclase** (Gk. *an-* not, *orthos*, straight, *klasis*, fracture), feldspar similar to orthoclase, but with soda in place of potash in its composition.

**Anquetil Duperron, Abraham Hya-cinthe** (1731-1805), Fr. orientalist, brother of Louis Pierre Anquetil. He studied theology, and his slight acquaintance with oriental languages became a passion. He visited India and collected stores of knowledge and manuscripts. In 1771 on his return he pub. the first European translation of the *Zend-Avesta* (3 vols.). In 1801-2 he pub. a Lat. translation from the Persian of the *Oupnek'hat* (*Upanishad*).

**Anquetil, Louis Pierre** (1723-1806), Fr. historian, b. at Paris. For some years he was director of the Rheims seminary. Imprisoned during the Reign of Terror, he later became a member of the Institute. The best known among his many historical works is the *Histoire de France*.

**Ansa**, in architecture, the handle of a vase; in astronomy, the jutting parts of Saturn's rings.

**Ansars**, or **Nossairians**, an Arab tribe inhabiting the N. of Tripoli, whose mystic religion is a compound of Mohammedanism and the anct. Syriac cults. There are also traces of Gnosticism. The origin of the religion is lost in obscurity, though it probably dates from the ninth century. See Dussaud's *Histoire et religion des Nossairis* (Paris, 1900), a standard work on the Alawis and Druses.

**Ansbach**, or **Anspach**, a tn. of Bavaria, dist. of Middle Franconia, on the Rezat, 25 m. S.W. of Nuremberg. The tn. contains 2 fine churches, various public monuments, and a castle, once the residence of the margraves of A., who belonged to the Franconian branch of the Hohenzollern house. In 1791 the last margrave gave up his principality to Prussia, and in 1806 Napoleon I. transferred it to Bavaria. Pop. 23,000.

**Anschluss**. The movement of the political union of Austria and Germany, which first found concrete expression in 1931 in the Austro-Ger. Customs Union proposal and finally ended successfully in the incorporation of Austria in the Reich in 1938. See AUSTRIA.

**Ansell, Richard** (1815-85), an Eng. landscape and animal painter, b. at Liverpool, first exhibited at the Royal Academy in 1840. His travels in Spain led to various Sp. subjects. Among his paintings are: 'Grouse Shooting', and 'A Galloway Farm' (both exhibited at the Royal Academy, 1840), 'Death of Sir William Lambton at Marston Moor' (1842), and 'Treading out the Corn' (1865).

**Anselm** (1033-1109) was b. probably

of noble parentage in the vicinity of Aosta in Piedmont. From early youth he desired to enter upon a monastic life, but did not succeed in carrying out his desires until 1056, when he was attracted to the monastery at Bec by the teachings of Lanfranc. He became an attached and worthy pupil of this great prior. Lanfranc was, however, raised to the see of Canterbury, and Anselm succeeded him in the abbacy of Bec, then probably the most famous school in Europe. On the death of Lanfranc in 1089 William Rufus kept the see vacant until 1093. In that year William, being taken ill and, imagining himself on the point of death, practically caused Anselm to be dragged from his monastery and given the regalia of the see of Canterbury. Anselm was very unwilling to accept the post, knowing probably the great difficulties he would have to face when Rufus recovered. He had not long to wait; the rest of Rufus's reign was spent in attempts to coerce the bold and fearless archbishop, who was at last driven into exile. Anselm, however, showed his real character in the magnificently fearless way in which he refused the requests of the king. Recalled on the accession of Henry I., he almost immediately plunged into a controversy with him over the question of investiture, and so undeviating was he in following his principles, that he went into exile, and even in 1105 threatened Henry I. with excommunication. A compromise was arrived at, however, by which temporal investiture was to be the prerogative of the king, and the investiture with the emblems of spirituality the papal prerogative. This compromise was practically adopted by empire and papacy in 1122 at Worms. Of A.'s writings we possess his philosophical treatises, *Monologion*, *Proslogion*, and *Cur Deus Homo*, and also a deep revelation of the piety and sincerity of his life in his *Meditations* and *Letters*. He was buried next Lanfranc in Canterbury and was canonised in 1494. Festival, Apr. 21.

**BIBLIOGRAPHY**.—The most noted ed. of A.'s works is that of Gerberton, first pub. 1675 and reprinted in Migne's *Patrologia Latina*; also F. S. Schmitt (ed.), *Opera Omnia Sancti Anselmi*, 1948. Life: R. W. Church, *St. Anselm*, 1870; M. Rule, *Life and Times of St. Anselm*, 1883; Eadmer (A.'s chaplain), *Vita Anselmi* (ed. M. Rule), 1884; J. M. Rigg, *St. Anselm of Canterbury*, 1896; J. Clayton, *Saint Anselm: A Critical Biography*, 1933. Consult also J. Fischer, *Lehre Anselms v. Canterbury über den Willen*, 1912; C. C. J. Webb, *Studies in the History of Natural Theology*, 1915; and C. Beyer, *La Vie de St. Anselme*, 1921.

**Anser** (Lat. goose) is the scientific name for the genus of birds which contains the goose (q.v.). *A. cinereus* is the grey goose, *A. hyperboreus* the snow goose, *A. segetum* the bean goose.

**Ansgar, Ansharius** or **Ansgarius**, St. (801-63), 'the Apostle of the North,' was b. in Picardy and d. at Bremen.



He went as a missionary first to Denmark, and then to Sweden. In 831 he was made archbishop of Hamburg, and the see was transferred to Bremen in 847. Among his works are some essays and a *Life of St. Willibrord*.

**Anshelm, Valerius**, Ger. physician and author of early sixteenth century. He practised in Bern from 1509, and in 1529 wrote the *Berner Chronik*, a hist. of the city largely based on original documents. He is especially valuable on the Reformation, of which he was an ardent supporter. An ed. in 6 vols. was issued by Stierlin, 1825-53. A. d. in 1540.

**'Anson'**, a battleship of the *King George V.* (q.v.) class, laid down on the Tyne in 1937 and commissioned in 1942. Displacement 35,000 tons. Complement 1500 men. Length 739 ft. 8 in., beam 103 ft., and draught 27 ft. 8 in. Equipped with 4 aircraft, with enhanced defence against air attack. Armament 10 14-in. guns, 16 5.25-in. guns, and 4 multiple pom-poms. The 14-in. guns were a new model with an effective range greater than the 15-in. guns mounted on earlier ships. Other ships of the class are, besides the *King George V.*, the *Duke of York*, and the *Hove*. The *Prince of Wales*, sister ship of the *King George V.*, was sunk by the Jap. in the S. China Sea on Dec. 10, 1941.

**Anson, George, Lord** (1697-1762), a famous Eng. admiral and circumnavigator of the world, was b. at Shugborough in Staffordshire. In 1712 he entered the navy, and by 1724 had reached the rank of captain. In 1740, during the war with Spain, he was made commodore of the S. Amer. squadron, and though the expedition was hopelessly mismanaged, his indomitable perseverance earned some success. See his *Voyage round the World*, 1748.

**Anson, Sir Wm. Reynell** (1843-1914), notable Eng. jurist, b. at Walberton, Sussex. In 1874 became Vincian reader in Eng. law at Oxford. In 1899 was returned as Liberal-Unionist M.P. for the univ. In 1902 became parl. secretary of the Board of Education. He pub. *Principles of the English Law of Contract*, 1884; *Law and Custom of the Constitution*, 1886-92.

**Ansonia**, city of New Haven co., Connecticut, U.S.A., on the R. Naugatuck. Manufs. brass, copper, hardware, clocks, etc. Pop. 20,000.

**Anstey, Christopher** (1724-1805), a country gentleman, was educated at King's College, Cambridge. His *chef-d'œuvre* was the *New Bath Guide*, a poem pub. in 1766. This satirical sketch of Bath life made a decided hit at the time, and is enthusiastically praised by both Gray and Walpole in their correspondence. None of his other works attain the standard of the *New Bath Guide*.

**Anstey, F.** (1856-1934), the *nom de plume* of Thomas Anstey Guthrie, a novelist of a clever and humorously fantastic imagination. He was educated at King's College School, London, and Trinity Hall, Cambridge. He made

a big success with his first book, *Vice Versa*, 1882, which he followed up (amongst others) by *A Fallen Idol*, 1886; *The Talking Horse*, 1892; *The Man from Blankley's*, a play, 1893. *Baboo Jabberjee*, 1897; *Loose among the Lions*, 1898; *The Brass Bottle*, 1900; *Only Toys*, 1903; *In Brief Authority*, 1915; *Four Molière Comedies*, 1931; *A Long Retrospect*, 1936.

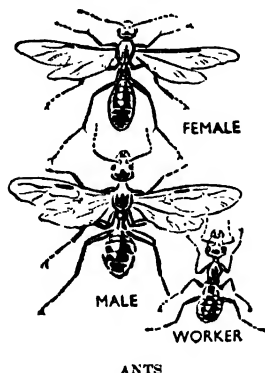
**Anstruther**, a tn. on the Firth of Forth, Fifeshire, Scotland, composed of the 2 royal burghs, Easter and Wester Anstruther. Fishing and fish-curing are the main industries. It is the bp. of the poet Tennant and Dr. Chalmers. Pop. 2000.

**Ant** (O.E. *amele*, A.-S. *æmele*; Ger. *Ameise*, from Old High Ger. *meizan*, to cut), Emmet, or Pismire, an insect of the family Formicidæ (Lat. *formica*, ant) of the order Hymenoptera, to which also belong the wasp and the bee. They are social animals of many genera and about 2000 species; they vary greatly, not only among the various genera, but also among the individual species. The *white As.* (termites) are often thought to belong to the A. family, but they are in reality members of the order Isoptera, and though in habit and construction of their homes they somewhat resemble As., they are not related morphologically.

As. are omnivorous, feeding on both vegetable and animal life, when alive and when dead. The harvesting As. (*Aphaenogaster*) store up grain for food, the leaf-cutting As. (*Atta*) completely denude trees and store the leaves in their nests for the sake of a fungus which will grow on them; other As. are cannibalistic. All delight in saccharine matter, and it is on this account that they keep their *cours*, i.e. aphides, which excrete a sweet substance, seen on plants as *honey-dew*.

The queen A. is the greatest in size, and in her nest there will be males, females, and neutrs, or aborted females. Sometimes both male and female are winged, sometimes winged and wingless live together. Among neutrs the *soldiers* have larger heads than the mere ordinary *workers*, and these defend their home when it is attacked. Both workers and fertile females have stings, and the poison they eject is known as *formic acid*. The male A. is usually smaller than the female. In the colony occasionally beetles and smaller As., as the *Formica rufa*, live peacefully, and are thought to take the place of domestic pets. Mating takes place between winged As. when in flight; the male soon after perishes, and the females which escape such perils as drowning and insectivorous birds tear off their wings and perform their new rôle. They either go voluntarily to a nest to lay their eggs, or are dragged to one by workers who will attend to the needs of the young. Occasionally the females found a new colony without the workers, performing all the work alone until the first brood is hatched; as this consists of workers, the female does not long pay attention to the eggs. The workers

carry the eggs from one part of the nest to another as the temp. requires, the nest consisting of irregular cells connected by passages. The larvæ are fed on semi-digested food by the workers, and when they grow older some species form cocoons: even in the pupa stage the workers feed them, and when the time is ripe for their entrance into the world, they help them to extricate themselves from their cases and lick them over when they are free. The so-called 'ants' eggs' often used for feeding goldfish, are really the pupal stage of the A.; their food value is small. Some *As.*, as the *F. sanguinea* and the genus *Polyergus*, make slaves of other *As.*, and in some instances are unable all through life to feed themselves, actually depending on their slaves to put the food



into their mouths. *F. sanguinea*, the blood-red robber A., occurs in Britain; the workers carry out special slave raids during which they attack workers of other species (chiefly *F. fusca*), and carry off the pupæ.

Mention may also be made of the peculiar partnership existing between some common species of *As.* and certain butterflies, reaching its highest level in butterflies of the family *Lycaenidæ*. The caterpillars have on the seventh abdominal segment a gland secreting a sugary liquid which is licked up by *As.*; the caterpillars benefit from the association since they are protected from their enemies (ichneumons) by the *As.* The caterpillars of the large blue butterfly are not only attended and 'milked' by *As.*, but they are even taken by the *As.* into their nests. Here the caterpillars become parasitic and prey on the A. larvæ; if deprived of the larvæ, they are unable to complete their development into the adult butterfly.

*As.* are usually very short-lived. The queens may last for sev. years, but the ordinary *As.* usually endure for only 1 summer; the workers survive in winter by hibernating. The intelligence of *As.* is a disputed sub-

ject, but they are known to show signs of excitement at the return of a strayed companion or on the approach of the queen, and they recognise members of their own species which have entered other nests. The workers of some species are almost sightless, but *As.* have the power of vision generally. They communicate with each other seemingly by means of their antennæ, and by stridulating organs of the abdomen. They take great care of the sanitation of their nests, removing the dead and all unnecessary objects immediately. The nests are frequently mounds of earth and leaves, but often are found beneath stones. An Australian A., the *Myrmecia*, builds enormous mounds, and a S. Amer. A. forms hills 5 or 6 ft. in height. See J. T. Moggridge, *Harvesting Ants*, 1873; F. White, *Ants and their Ways*, 1883; F. W. Frohawk, *Natural History of British Butterflies*, 1926; H. St. J. K. Donisthorpe, *British Ants*, 1927; Sir John Lubbock, *Ants, Bees, and Wasps* (ed. J. G. Myers), 1929; E. N. Marais, *The Soul of the White Ant*, 1937; and Carol P. Haskins, *Of Ants and Men*, 1946.

**Antacids**, in medicine, substances which have the power of neutralising or counteracting acids in the gastric juices or excreta. The most important are caustic soda and potash, with their carbonates, bicarbonates, acetates, and citrates; ammonia and magnesia, with their preparations; bismuth subcarbonate. Some of these, like soda, act directly upon the gastric membrane; others, like the acetates and citrates, act indirectly through the blood, being converted into carbonates. The direct A. are used in dyspepsia, where it is required to counteract the excessive acidity of the stomach; and the indirect in gout, where the excess of uric acid in the blood is to be counteracted.

**Antæus**, son of Poseidon and Gea, was a Libyan giant of Gk. mythology who was invincible at wrestling until overcome by Hercules.

**Antagonist Muscle**, one which acts in direct opposition to another which is attached to the same part. The flexors are antagonists of the extensors. Con-  
gener muscles are those which produce the same movements.

**Antakleh**, see **ANTIOCH**.

**Antalcidas** was a Spartan soldier and diplomatist, who succeeding in undermining the friendly relations between Athens and Persia in the fourth century B.C., and who later, by his naval operations in the Hellespont, forced Athens, in 386 B.C., to accept the peace of A. By this treaty all Asia Minor was to be under Persian rule, and all the Gk. cities, except Lemnos, Imbros, and Scyros, became independent.

**Antalkalia**, substances which neutralise alkalis, such as acids.

**Antalo**, a tn. and plain in the Tigré dist., Abyssinia. In some parts of the plain agriculture is followed.

**Antanarivo**, or **Tananarivo**, the cap. of Madagascar, situated in the interior

of the is. It is built on the summit and slopes of a large Y-shaped ridge, nearly 700 ft. above the encircling *padi* fields, which themselves are more than 4000 ft. above sea-level. This ridge, 3 m. long, is very narrow, and most of the houses are built in artificial terraces rising tier on tier like the seats in an amphitheatre. Up to 1895, when it was bombarded by the Fr., A. was a tn. of wood or rush dwellings, and a few timber palaces. To-day it contains numerous public buildings of some architectural pretensions—an observatory, a cathedral, a royal palace, Gov. buildings, sev. brick and stone churches, hospitals, schools and colleges, law courts, and hundreds of substantially built dwellings and good if narrow roads; while the Fr. residency, sent of the governor-general, is a handsome building in the Renaissance style. There is also a municipal theatre, where native players give Malagasy comedies, and where Fr. opera companies pay visits. The city is lighted by electricity, has a good water supply and telephone service, and a really superb railway station. Pop. 120,000.

**Antar**, an Arabian warrior and poet of the sixth century. He was one of the poets whose works were called 'Moullakât,' and the hero of a romance, trans. into Eng. by Terriek Hamiltou, 1819. This romance gives a description of the manners and customs of the Bedouin Arabs.

**Antarctica**, a circumpolar S. continent. It has as yet no permanent settlements, but divs. have been named Adelle Land (q.v.), Alexander I. Land, Ballery Is., Coats Land, Enderby Land, Graham Land, Ingrid Christens Land, Kaiser Wilhelm II. Land, Kemp Land, King Edward VII. Land, King George V. Sound, Knox Land, Mary Byrd Land, Oates Land, Princess Elizabeth Land, Queen Mary Land, S. Victoria Land, Wilkes Land. The Brit. Empire has succeeded in claiming three-quarters of A., an area between three and four million sq.m., by the application of the sector principle. By this principle, all lands S. (or, in the case of the Arctic, N.) of certain inhabited areas are held to be the natural property of those areas. There are 3 main Antarctic sectors: the Falkland Is. Dependencies, administered from the Brit. Colonial Office; the Ross Sea Dependency, governed by New Zealand; and the vast new prov. claimed by Australia in 1933, when Sir Douglas Mawson took possession of a large sector of A. Norway in 1939 annexed that part of the Antarctic coast stretching from the border of the Falkland Is. Dependencies in the W. to the border of the Australian Antarctic Dependency in the E.—i.e. between 20° W. and 45° E.—together with the land within this coast and its territorial waters. The ter. is of great importance for the Norwegian whaling industry. In 1939 the Lincoln Ellsworth expedition claimed 430,000 sq. m. of A. for the U.S.A. and named it Princess Elizabeth Land. With an average elevation of 6000 ft., the highest

peaks range between 10,000 and 15,000 ft. Some parts are known to have copper and coal deposits; but the coastal lands are chiefly important for the whaling fisheries.

Some day a delicate task may await the International Court at the Hague or elsewhere in adjudicating on the claims to the S. Polar continent which in recent years have been pressed with increasing insistence. Commander Byrd, for example, set out in Jan. 1940 from New Zealand for A., among his aims being 'the consolidation of the work of previous Amer. explorers with a view to making formal territorial claims to some 650,000 sq. m. of Antarctica.' Until lately, previous exploration has been the commonly accepted principle. Thus Norway, in making large claims in 1939, took care to avoid inclusion of parts discovered by Britain in the W. or by Australia in the E., just as Australia, in delimiting the regions charted by Sir Douglas Mawson, left a gap where the name of Adelle Land (Fr.) bears witness to the exploration of D'Urville in 1840. An added difficulty subsequently arose from a new type of claim. Both in the Arctic and in the Antarctic it has been suggested that nations whose shores border on the oceans in question should draw lines from their E. and W. extremities to the Poles and claim all in between. On this basis Argentina would gain a S. Polar section that would strike straight across regions charted by Great Britain and the U.S.A. But the final element of confusion is added to the whole question because, if it were referred to the judgment of the International Court of Justice, that court would be bound to find that till now international law has taken no account of any claim to ter. that was not backed by permanent settlement, and that as no country has yet found it worth while to keep a permanent pop. in that inhospitable land all claims alike are spurious.

**Antarctic Ocean and Exploration.** Until the eighteenth century the A. regions existed in human imagination as a great continent extending into temperate latitudes; but though, unlike the Arctic regions, the A. consists largely of land, as was estab. before Cook's voyage of 1774, it was certain that such southward land as might exist only extended beyond the A. circle in one place—to the S. of S. America. Since Cook's voyages no new land has ever been found S. of the A. circle, apart from the southward extension of what may be the E. coast of Graham Land (60° W.), but it has been fairly clearly estab. since the year 1900 that the A. regions consist of a continent extending N. and S., over an area one and a half times greater than that of Europe, completely cut off from the rest of the world by the A. Ocean. Various explorers have touched the N. limits of this continent at King Edward VII. Land, Victoria Land, Wilkes Land, Budd's High Land, Kaiser Wilhelm II. Land, Enderby Land,

Coats Land, and Graham Land, the great masses of pack ice between the last and first named leaving the line of the continent conjectured between 70° W. and 15° W. Antarctica or the A. Continent appears to be an ice-clad mountainous continent crowned by a vast glacial table-land. Between King Edward VII. and Victoria Lands extends the Great Barrier, an ocean ice-cap of great extent



E. N. A.

#### THE BARNE GLACIER, VICTORIA LAND

A photograph by Herbert Ponting, taken during Scott's last expedition to the Antarctic.

and stupendous thickness, covering perhaps nearly 200,000 sq. m. of the A. Ocean, and apparently ending in a bight in 86° S. The glacial covering of Antarctica stretches N. and S. for over 1000 m. and covers an area of perhaps 5½ million sq. m. The glacier-covered plateau within 100 m. of the Pole was found by Sir Ernest Shackleton to be 11,000 ft. in altitude in 88° S. 162° W., the average elevation of the continent being about 6500 ft. Mt. peaks discovered by Amundsen in 164° W. 85° S. were found to attain a height of 15,000 ft. The S. Pole Plateau itself is estimated to be nearly 11,000 ft. high. Active volcanoes have been seen in Graham Land and Victoria

Land, and the hypothesis of earthquakes is an inference from the great increase in the amount of drift-ice from the A. and the size of the bergs observed in 1891-96. The N. limit of the pack appears to lie along 60° S. in summer, but its winter lat. is unknown. The depth of the A. Ocean varies considerably. From the neighbourhood of Tierra del Fuego to Kerguelen Is. it is about 2500 fathoms. Round the Pole at 80° S. it is over 2000 fathoms, while E. of Victoria Land it varies from 200 to 800 fathoms. Submarine ridges rise up at Graham Land to about 100 fathoms of the surface. Borchgrevink assigned to the magnetic pole the position of 73° 20' S. and 146° E., but the local attractions of volcanic rocks and magnetic storms made his observations erroneous, and Profs. Mawson, Mackay, and David have subsequently located it with more probability at 72° 25' S. 155° 16' W. on the inland ice some 7000 ft. above sea-level. The summer climate of the A. region has long been recognised as cold and ungenial, but the presence of coal seams within 300 m. of the Pole points to a former milder climate conducive to extensive vegetation even at the Pole itself, though late discoveries now establish Antarctica as being barren of all terrestrial life except that of the lowest microscopic organisms. Generally speaking, the summers are remarkably cold, the winters not extraordinarily so. There is evidence of a permanent S. Polar anti-cyclone, and terrific storms of wind and a succession of cyclones prevail in the vicinity of Victoria Land, and indeed the N. side of the A. is recognised as the windiest part of the world, records showing that for some months the average wind velocity is 50 m.p.h. The fall of snow and rain observed is estimated to be equivalent to an annual rainfall of about 30 in. The flora of Antarctica appears to be limited to a few species of lichens and reindeer moss found on Victoria Land and in the Palmer Archipelago, though the *Belgica* expedition discovered mosses and grass on the shores of Belgica Strait off Graham Land. The fauna comprises different species of seals, penguins, petrels, skua; of insect life, diptera with rudimentary wings, minute acarides; and of marine life a great number of species representing plankton, littoral forms, and benthos. There appear to be no right whale (or Greenland whale), walrus, or narwhal, and no land mammals.

The hist. of A. exploration may be said to begin with Capt. James Cook's voyages in the *Resolution* and *Adventure*, 1772-75, though Bouvet, Dalrymple, and others had done something to dispel the illusion of a S. Atlantic continent stretching to tropical lat.

It is impossible here to describe in any detail the voyages prior to that of the *Challenger* under Nares in 1874, but Ross in H.M.S.S. *Erulus* and *Terror* discovered and explored Victoria Land (1839-43), naming numerous is. and

capcs. The *Challenger* in 1874, commanded by Nares, was the first steamer to cross the A. circle, but though Nares went only to 66° S. southward of Kerguelen Is. the marine flora he collected and his recorded soundings and other information enabled Sir John Murray to draw numerous valuable inferences as to the existence and trend of an A. continent. The circle was not again crossed until 1893, when Evensen in the *Hertha* sighted Alexander Land, reaching 69° 10' S. in 76° 12' W. In 1894 Christensen reached 74° S. at Coulman Is., finding that the sea was easily navigable to the S. Landing near Cape Adare, his party were the first people to set foot on what is generally believed to be the A. continent. In 1898 funds were raised to organise the expedition of the *Belgica*, which in Jan. of that year left Staten Is. for the A. The geographical results were poor so far as land discovery or penetration towards the Pole are concerned, but soundings estab. the existence of a continental shelf of great breadth connected with land to the S. In 1900 Borchgrevink (*q.v.*) with his party of the *Southern Cross* landed on Possession Is. and on the mainland at the base of Mt. Melbourne. With the aid of sledges and dogs he advanced S. to 78° 50'. The next year the *Discovery*, equipped under the supervision of Sir Clements Markham, under the command of Commander R. F. Scott, R.N., left Cowes with Lt. (later Sir Ernest) Shackleton, Dr. Wilson, and others on board. The expedition during 1901-4 discovered King Edward VII. Land, a vast stretch of the austral continent reaching from 152° to 157° E.; ascended the glacial ice-cap of Victoria Land, touching, after a 300 m. journey, an altitude of over 9000 ft. in 77° 39' S. 146° E. The work of this expedition, together with the contemporaneous voyages of Nordenskjöld, who explored Palmer Land, and of the Ger. expedition under Drygalski, and the somewhat later journey of Dr. Charcot in 1904 to W. Palmer Land, confirmed the theory of the existence of an A. continent which, until Bruce discovered Coats Land in 74° S. 24° W., directly opposite S. Victoria Land, had begun to be disbelieved. In 1908-9 Sir Ernest Shackleton carried out the brilliant scientific, geodetic, and geographical discoveries which earned for him his knighthood. He travelled nearly 2000 m., and ascertained the nature and extent of the Great Barrier and reached a glacier-capped plateau of 11,000 ft. elevation in 88° 23' S. 162° W., approaching within 100 m. of the Pole. After the expedition of Mawson above alluded to, Capt. Scott in 1910 set out on his tragic second journey to the Pole. In the meanwhile Amundsen, the celebrated N. Pole explorer, wintering on the Great Barrier in 1911, reached the Pole on Dec. 16, 1911, having followed 164° W. to the mt. range in 84° S., and thence,

crossing the Devil's Glacier, traversed the S. Polar plateau. Scott also reached the Pole, only to find when he did so that Amundsen had preceded him. (See SCOTT, ROBERT FALCON.) In Jan. 1913 Lt. Filchner, in command of a Ger. expedition, reported the discovery of Prinz Luitpoldland and Kaiser Wilhelm II. Barrier. Later news of the A. is that of Prof. (now Sir Douglas) Mawson, who set out in the *Aurora* in 1911 with Dr. Mertz to gain additional knowledge of those lands which lie close along the arc of the A. circle due S. of Australia between S. Victoria Land and Kaiser Wilhelm II. Land (where the *Gauss* Ger. expedition had its winter quarters in 1902-3), a tract which had scarcely been touched since the voyages of Balleny, Wilkes, and D'Urville. Sir Douglas Mawson has done much to delineate the A. plateau from the N., and the installation nearly 40 years ago of 2 wireless stations in communication with the Gov. Meteorological Office of Australia on lands never before sighted proved of great value as a means of warning ships and agriculturists and others, especially in Australia, of the approach of blizzards and storms.

No explorer has yet crossed the A. continent. Shackleton in 1914 proposed to make the attempt, as did Bruce in 1908, but the expense involved in such an expedition was prohibitive. It is regrettable that public support is not generous where an appeal is made solely to promote scientific research. Hence it is the better opinion that some concession must be made to the popular prejudice in favour of an effort that may be at once spectacular and utilitarian. (Consult *The Polar Regions* by R. N. Linderoth Browne.) At the end of 1928 Commander Byrd set out at the head of an Amer. expedition for a comprehensive exploration of the A. continent, and since establishing a base in the Bay of Whales, has made aeroplane flights. He took wonderful pictures during his flight over the S. Pole and obtained much new scientific information on meteorology, geology, etc. Meanwhile the Brit. Discovery Committee (*q.v.*) has organised whaling research expeditions in these waters, both in the wooden boat *Discovery*, and in the new steel boat *Discovery II.*, the main object of these expeditions being the utilitarian one of checking the threatened disappearance of the whale as a commercial asset by supplementing our existing knowledge of its migrations and breeding. At the end of 1928, Sir Hubert Wilkins, using Deception Is. as a base, flew over Graham Land, proving that it was not part of the main mass of the A. continent. In 1934 Admiral Byrd claimed to have discovered extensions of Little America to the N. of the Edsel Ford Range, which he named Marie Byrd Land and described as giving evidence of important coal deposits some 200 m. from the S. Pole. Lincoln Ellsworth, the Amer. explorer, with a

Brit. pilot, Herbert Hollick-Kenyon, left N. Zealand towards the end of Nov. 1935 for a research flight, reaching Little America by sledge, after which their wireless sets failed and nothing further was heard of them till mid-Jan. when they were rescued by the R.R.S. *Discovery II*. They had flown some 2,000 m. to Admiral Byrd's base on the Ross Sea before being forced down. In the same year Norwegian explorers are said to have found new land between 80-45° E. long. and 67-50° S. lat. and 73-00° E. long. and 69-10° S. lat. in the Enderby quadrant, which they named Ingrid Christens Land. Early in 1937 Lars Christensen, the Norwegian explorer, accompanied by M. Wideroe, as pilot, reported the discovery of a range of mts. between the 35th and 40th deg. of long., the highest peak of which was 4500 ft. They dropped the Norwegian flag at a point 38° E. and 69-30° S. New mountainous country with peaks rising to 10,000 ft. were seen running from 26° E. and 71-30° S. for some 200 m. westward. Between 1935 and 1937 the *Discovery II* circumnavigated the A. continent, covering a distance of 50,000 m., investigating the distribution of whales in the whole region, besides taking observations of the hydrology and biology of the Ross Sea. The principal geographical features discovered by the Brit. Graham Land expedition under Mr. John Rymill, which left London in 1934, have been named King George V. Sound. This sound separates Graham Land from Alexander I. Land and at its mouth is 15 m. wide, extending some 250 m. in a southerly direction before turning W.

There were sev. A. expeditions during and following the Second World War, the largest being from the U.S.A. Brit. explorers and scientists of the Falkland Is. Dependencies Survey commenced in 1941 a systematic survey of all aspects of their sector and research into human adaptation to low temps. See also ANT-ARCTICA. See James Cook, *A Voyage towards the South Pole and Round the World*, 1777; S. Weddell, *Voyage towards the South Pole*, 1825; D. d'Urville, *Voyage au Pôles sud* (Paris), 1841-45; J. C. Ross, *A Voyage of Discovery and Research in the Southern and Antarctic Regions*, 1847; H. J. Bull, *Cruise of the 'Antarctic'*, 1896; C. E. Borchgrevink, *First on the Antarctic Continent*, 1901; L. Bernacchi, *To the South Polar Regions*, 1901; R. F. Scott, *Voyage of the 'Discovery'*, 1905; H. R. Mill, *Siege of the South Pole*, 1905; Sir E. H. Shackleton, *The Heart of the Antarctic*, 1909; Sir D. Mawson, *The Home of the Blizzard*, 1915; C. R. Markham, *The Lands of Silence*, 1921; Reports of the Discovery Committee (Colonial Office); H. C. Ponting, *The Great White South*, 1923; A. W. Greely, *The Polar Regions in the Twentieth Century*, 1929; C. E. Lescroart, *South With Mawson*, 1948.

Antares, the name of a bright star, Alpha scorpiotis.

Ant-bear, the popular name of the

*Myrmecophaga jubata*, is also known as the great ant-eater (q.v.).

Ant-catcher, the ant-thrush or ant-bird of Old and New Worlds.

Ant-eaters, popular name for members of the mammals known as Myrmecophagidae of the order Edentata, peculiar to S. America. It is toothless, its head being prolonged into a long snout containing a protrusible tongue always well moistened with saliva, with which it picks up the ants and termites on which it feeds. The body is about 4 ft. long, and the bushy tail, which serves as protection against cold, about 2½ ft. As it walks it bends its long and sharp claws beneath it, but it can use them in its defence. It produces a single offspring at a birth. *Myrmecophaga jubata* is the great A., also known as the ant-bear or tamanoir; *Tamandua* and *Cyclocuratus* are other genera, both arboreal.



ANT-EATER

Ant-eater, Scaly, see PANGOLIN.

Ant-eater, Spiny, see ECHIDNA.

Antecedent : 1. In grammar, the substantive to which a relative refers. 2. In logic, (a) the first of 2 propositions in an enthymeme, or argument of 2 propositions. The second proposition is called the 'consequent', e.g. in 'Every man is mortal; therefore every king is mortal', 'Every man is mortal' is the A., and 'every king is mortal' is the consequent. (b) The conditional part of a conditional or hypothetical proposition, e.g. in 'If luxury prevails, kingdoms must decay', 'If luxury prevails' is the A. 3. In mathematics, the first of the 2 terms of a ratio. Thus in the proportion 2:4::8:16, 2 and 8 are As., and 4 and 16 are consequents.

Antediluvian (Lat. ante, before, diluvium, flood), a word used in speaking of anything which existed before the Flood. In palaeontology it is not used with the biblical significance, as science does not recognise a universal flood, but with the sense of having existed before the transformation of the earth by water, in which connection, however,

it is to be noted that recent excavators at Ur and Kish, in Mesopotamia, have found proofs of a flood having occurred there and that the inhabitants after it differed from those that preceded it. The 10 antediluvian patriarchs were Adam, Seth, Enos, Cainan, Mahalaleel, Jared, Enoch, Methuselah, Lamech, and Noah. The term is now used generally in irony.

**Antefixa** (Lat. *antlc*, before, *fixa*, fixed), blocks with vertical fronts placed along over a cornice in classical buildings to hide the ends of the joint tiles. They were usually ornamented with a flower, leaf, bead, or group of figures. The word was also applied to small bas-reliefs ornamenting friezes.

**Antelope**, a name applied to many ungulates of the order Artiodactyla. It is most properly used in speaking of the *Antilope*, or Indian black-buck, but it is often used in connection with the *Antilocapra*, N. Amer. prongbuck, or prong-horned A., which constitutes in itself the family Antilocapridæ and is the sole species. As. are, however, confined to the family Bovide, which do not shed their hollow horns; the Antilocapridæ, however, shed their horns, which are branched. Among the Bovide are included sheep, goats and oxen, and the As. may almost be regarded as any of the animals which cannot be considered as any of these. They are found in immense numbers in S. Africa, and also in other continents, but are totally absent in Australia; in many cases reckless hunting has practically exterminated genera which were extremely numerous. They are graceful creatures living in the plains (exceptionally on mountains, e.g. chamois), have rounded or lyrate horns present in all males, though not in all females, and generally there is a curious tear-gland filled with waxy matter beneath the eyes. They are dependent on their swift flight for their safety, as their horns provide small means of defence.

Among the numerous animals grouped under the term A. are the gnu, eland, bartebeests, addax, klipspringers, chamois, gazelles, cheirus (serows), pallas, saigas, nilgais, and kudood; the bliesboks, duikerboks, black-bucks, springboks, water-bucks, bonteboks, reedboks, gemsboks, steinboks, grysboks, bushbucks; the royal, sable, roan, quino, Baker's, and harnessed As.

The royal A., or *Neotragus*, includes only one species, and the females are hornless; it is about the size of a hare. The sable, roan, quino, and Baker's As. belong to the genus *Hippotragus* (with the extinct blaubok), and greatly resemble the addax; they are large animals, and both males and females carry long horns. The harnessed As. constitutes the genus *Tragelaphus*, to which the bushbucks belong; they are the largest of the As., usually only the males have horns, their faces are marked, and their beautiful bodies are striped as if they bore harness. For characteristics of the gnu, eland, etc.,

see under their respective headings. Consult P. L. Sclater and O. Thomas, *The Book of Antelopes*, 1894-1900; W. H. Flower and R. Lydekker, *Introduction to the Study of Mammals*, 1891.

**Antennæ** (Lat. *antenna*, a sail-yard), popularly known as *horns* or *feelers*, are the anterior appendages on the heads of some Arthropods, namely, the crustaceans, insects, and myriapods. In insects there are always 2, but crabs and lobsters have 4 or more. They vary greatly in length, form, and comparative thickness, and may have over 100 joints; they form tubes consisting of auditory, sensory, and olfactory nerves.

**Antenor**: 1. Athenian sculptor of sixth century B.C. He made the bronze figures of Harmodius and Aristogiton, which were carried away to Persia by Xerxes in 480 B.C. They were restored to Athens by Alexander the Great. 2. In Gk. legend, the wise Trojan who advised that Helen should be sent back to her husband, and advocated peace. There is a legend that he betrayed Troy to the Gks., and others that he founded another city on its site, or migrated to Cyrene, or founded Patavium.

**Antequera**, a tn. in Málaga prov., Spain, on l. b. of the Guadalhorce. Held by the Moors from A.D. 712 to 1410, and has among its antiquities a Moorish castle and walls. Trade in oil and fruit, and some manufs. of silks, leather, etc. Pop. 32,000.

**Anthelia** (Gk. *ἀντί*, against, *ἥλιος*, the sun), a phenomenon observed by a person whose shadow is cast upon a moist surface, such as a cloud, fog, or dewy grass; around the shadow are sev. concentric rings, luminous and coloured, shading into white at the edge.

**Anthelmintics**, medicines which destroy or cause the expulsion of worms, as santonin for the round worm; koussou, kamala, male fern, turpentine, arca nut, and pomegranate for the tape and broad worms; injections of salt, tannin, quassia, alum, iron, etc., for the thread-worm; and thymol for *Ankylostoma duodenale*.

**Anthem**, a shortened form of antiphon, is a musical composition set to sacred words and used in the service of the Church since Elizabeth's reign. It was first written for alternate parts, but may now be written for solo, soli, or chorus, or a combination of all three.

**Anthemis**, a genus of the Compositæ, of which the Brit. species are known as chamomile; they possess medicinal properties. *A. arvensis*, *A. cotula* (mayweed) and *A. nobilis* grow in fields and on commons. *A. tinctoria* is used in France for a yellow dye.

**Anthemius** (d. c. 534), Gk. mathematician and architect, b. at Tralles in Lydia. He began the rebuilding of St. Sophia in Constantinople for the Emperor Justinian, the church having been destroyed by fire in 531; it was completed by Isidorus of Miletus in 537. He wrote sev. mathematical

treatises, and he is credited with the invention of domes. See *Mémoires de l'Académie des Inscriptions*, 1786.

**Anthems, National**, see NATIONAL.

**Anthér** is a term applied to the pollen-bearing body at the tip of the filament of a flower. It is united to the filament by means of a *connective*; and A., filament, and connective form the stamen. The A. consists of 2 A.-lobes, sometimes of 1, which contain the 4 pollen-sacs, which burst open when ripe to free the pollen. It is said to be *versatile* if it swings on the filament (as in grasses), *dorsifixed* if immovable. In some plants, e.g. daisy and potato, the As. cohere, while the filaments are free; this is called the *syngenesious* or *syanthærous* condition.

**Anthocyanins**, in botany, are a complex group of pigments which, in the main, give to red and blue flowers, etc., their peculiar colours. The red colour of roses, poppies, and geranium flowers as well as of the roots of beets and radishes, is due to A. Similarly, the blue colour of violet, larkspur, and cineraria flowers, as also of the fruits of grape-vines and bilberry bushes, is due to A. Again, it is due to the development of a red A. pigment that many leaves derive their autumnal redness. Expressed in botanical language, the different colours of flowers and of fruits are due to the varying colour of the cell-sap and also to the different distribution of the cells containing the coloured cell-sap, and also to the different combinations of dissolved colouring matter with the yellow, orange, or red chromoplasts and the green chloroplasts. Like litmus, some A. are blue or violet in an alkaline solution and red or reddish in an acid solution. Under certain conditions they are also dark red, dark blue, and even blackish blue. Alkalis, too, frequently change the colour to green. Willstätter's researches have extended our knowledge of the chemical constitution of A. They are glucosides, i.e. compounds of glucose with other substances known as anthocyanidins, into which they can be decomposed by boiling with acids (hydrolysis). Thus cyanin, the blue colouring matter of the cornflower and the first A. to be studied by Willstätter, yields on hydrolysis 2 molecules of glucose and cyanidin. The other fundamental anthocyanidins besides cyanidin itself are pelargonidin (in the geranium) and delphinidin (in the larkspur). A large number of compounds of glucose with these 3 parent substances cyanidin, pelargonidin, and delphinidin are possible, giving a wide range of colours in different flowers. The anthocyanidins are closely related to flavones, yellow pigments of wide occurrence in plants. Blood-coloured leaves, such as those of the copper beech, owe their characteristic appearance to the combined presence of green chlorophyll and A.; when such leaves are boiled in water the A. is dissolved, leaving chlorophyll, so that the leaves turn green in colour. See M. Wheldale, *Anthocyanin Pigments of Plants*, 1916; L. T. Hogben, *Pigmentary Effector System*, 1924.

**Anthology**, a compound Gk. word, used metaphorically, which means literally a 'collection of flowers.' This title is applied to a work which is a collection of select extracts or choice passages from various branches of literature, but more generally the term is restricted to collections of short or lyrical poems. Most countries have their poetic As., Asiatic literature being extremely rich in them. From Turkey to Tartary, from Persia and Arabia, on through India to China and Japan one finds these caskets of the gems of national literature. The Psalms of David and the Proverbs of Solomon are veritable Heb. As. To Confucius is attributed the compilation of the Chinese *Shi-King* (Book of Songs), and it is claimed for it that it is the oldest A. in the world. Knicker pub. a Ger. translation of it in 1833, and his countryman, Von Hammer-Purgstall, rendered in 1818 a similar service by introducing Persian literature to the W. By far the most important A. is the Gk. A. The first collection of Gk. poems, called the *Stephanos* (Garland), was made by Meleager, a Syrian b. at Gadara at an uncertain date, but probably about the end of the second century B.C. It included poems by 46 poets, among them being Sappho, and, as is not an uncommon thing in As.—their compilers being but human—a few poems by the editor. This work was added to by succeeding editors, whose MSS. have been lost, the earliest and fullest of the extant versions being that of Constantinus Cephalas, a grammarian who fl. in the middle of the tenth century A.D. It contained excerpts from more than 300 poets, and the poems ranged from the sixth century B.C. to the tenth century A.D. Early in the fourteenth century Maximus Planudes laid violent and clumsy hands upon this beautiful collection of Cephalas, abridging, rearranging, and even altering. For 300 years his was the only Gk. A. known, but in 1606 Salmasius rediscovered the A. of Cephalas in the library of the counts palatine at Heidelberg. A good ed. of this is Dübner's. There was no A. among the anc. Romans, and it was not until 1573 that Scalliger pub. in Leyden an imitation of the Gk. A. under the title *Catalecta Veterum Poetarum*. Other editors of Lat. As. are Pithou (Paris, 1590) and Peter Burmann (Amsterdam, 1759 and 1773). That of Riese (1870) contained nearly 1000 poems. Eng. verse from the Elizabethan poets down to Wordsworth has been collected in F. T. Palgrave's *Golden Treasury*. By many this is regarded as the standard Eng. A., and undoubtedly as a pioneer in this field it may be said to have influenced its successors. The *Oxford Book of English Verse* was ed. by Sir A. T. Quiller-Couch, who profted by the mistakes of his predecessor, and in it are included many beautiful numbers the omission of which by Palgrave is difficult to account for. Such omissions included Coleridge's *Kubli Khan* and Keats's *Ode on a Grecian Urn*. The range of the *Oxford Book*



is from 1260 down to 1918 in strict chronological order of birth. The total number of poems is 967. Other modern Eng. As. are Allan Ramsay, *Tea-Table Miscellany*, 1724-40; Thomas Campbell, *Spectimens of British Poets*, 1841; T. H. Ward, *English Poets*, 1883; F. Locker Lampson, *Lyra Elegantiarum*, 1867 (rev. 1891); W. B. Yeats, *A Book of Irish Verse*, 1895 (revised 1900 as *Modern Irish Poetry*); Robert Bridges, *The Spirit of Man*, 1916; Sir Henry Newbolt, *An English Anthology of Prose and Poetry*, 1921; T. Caldwell, *The Golden Book of Modern English Poetry*, 1922; Robert Lynd, *Anthology of Modern Poetry*, 1922; Sir A. C. Quiller-Couch, *The Oxford Book of English Prose*, 1925; Grace Rhys, *A Celtic Anthology*, 1927; H. E. Rollins (ed.), *England's Helicon* (1600, 1614), 1931-32; G. Bullett, *The English Galaxy of Shorter Poems*, 1933; Sir A. C. Quiller-Couch, *The Oxford Book of Modern Verse* (1892-1933), 1936; W. B. Yeats, *The Oxford Book of Modern Verse*, 1936; G. Lacey May, *English Religious Verse* (Everyman's Library), 1937; W. H. Auden, *Oxford Book of Light Verse*, 1938; Walter de la Mare, *Behold this Dreamer*, 1939, and *Love*, 1945; Lord David Cecil, *The Oxford Book of Christian Verse*, 1940; Edith Sitwell, *Anthology* (verse from Chaucer to Hardy), 1940; Hugh Macdarmid, *The Golden Treasury of Scottish Poetry*, 1941; while among Am. As. should be mentioned: E. C. Stedman, *American Anthology* (1787-1899), 1900; Bliss Carman, *The Oxford Book of American Verse*, 1927; Louis Untermeyer, *American Poetry from the Beginning to Whitman*, 1931; H. H. Clark, *Major American Poets*, 1936.

**Anthron**, Charles (1797-1867), Amer. classical scholar, was b. in New York. He was called to the bar in 1819, appointed adjunct prof. of anc. languages in Columbia College in 1820 and prin. prof. in 1835. He ed. Lemprière's *Classical Dictionary* in 1841 and compiled a *Dictionary of Greek and Roman Antiquities* in 1843.

**Anthony**, Saint, see ANTONY, SAINT.

**Anthony**, Susan Brownell (1820-1906), Amer. reformer, b. at Adams, Massachusetts, of Quaker parents, and taught in a New York school from 1835 to 1850. She was a zealous agitator for total abstinence and the abolition of slavery, and, after the Civil war of 1861-65, for woman suffrage. In 1868 she founded the *Revolution*, and was one of the authors of a *History of Women Suffrage*, 1881-87. See her *Life* by Harper, 1898.

**Anthophyllite** (Gk. *άνθος*, flower, *φύλλον*, leaf), a mineral belonging to the Amphiboles, containing silicate of magnesium and of iron. It is of a brownish-yellow colour, has a pearly lustre, and its structure is fibrous. It is a metamorphic mineral.

**Anthospermum**, or amber-tree, a genus of Rubiaceæ found in Africa and Madagascar. It is allied to the coffee and cinchona.

**Anthoxanthum**, a genus of grasses (Gramineæ) of which the species *A. odoratum* is known to farmers as sweet

vernal grass. It has pale yellowish-green flowers and only 2 stamens; the stems contain coumarin, which causes the fragrance of new-mown hay.

**Anthozoa** (Gk. *άνθος*, flower, *ζωον*, animal), a class of Coelenterata, which includes corals, madrepores, and sea-anemones. All inhabit the sea, usually in the warm climates. They are synonymous with the Actinozoa.

**Anthracene** (C<sub>14</sub>H<sub>10</sub>), a substance prepared from coal-tar. The coal-tar is subjected to fractional distillation; the fraction up to 170° consists of crude naphtha, from 170° to 230° carbolic oil is separated, from 230° to 270° creosote oil is separated, and above 270° the distillate is A. oil, whilst the residue in the still is pitch. The A. oil is distilled again with one-third of its weight of potash in an iron retort; the distillate, which consists of A. and phenanthrene, is treated with carbon bisulphide, which dissolves the phenanthrene, leaving A. The A. is afterwards purified by crystallisation from benzene.

A. is a crystallin. solid, melting at 213° C. and boiling at 351°. It is only slightly soluble in alcohol and ether, but is easily soluble in benzene. Its commercial importance arises from the fact that it is the basis of the manuf. of the important dye-stuff alizarin (*q.v.*) employed in producing Turkey-red.

**Anthracite**, or stone coal, a particularly hard and lustrous variety of coal, slow in ignition, but giving out an intense heat with little effusion of smoke. It is used for drying hops and malt; in blast furnaces where a high temp. is required; and for steam navigation purposes. It has been suggested that A. has been produced from vegetable matter that has been more completely macerated and deprived of its putrescible constituents before submergence than that producing ordinary bituminous coal, or that the submergence took place in shallow water where the plant substance was exposed to the oxidising influence of the air, thus minimising the amount of hydrogen and carbon compounds. Most As. contain 90 per cent of carbon, whilst bituminous and gas coals contain from 75 to 80 per cent of carbon, the remainder being made up of hydrogen, oxygen, and nitrogen together with varying amounts of ash.

A. is found in large quantities in Pennsylvania and in S. Wales, where more than half of the supply is exported for use on steamers in all parts of the world.

**Anthracotherium**, genus of mammiferous fossils found in the Eocene and Miocene strata of Paris and Tuscany. They belong to the family Anthracotheriidae of the order Ungulata and somewhat resembled pigs in shape. They appeared in the Eocene and Miocene periods.

**Anthraquinone** (C<sub>14</sub>H<sub>8</sub>O<sub>2</sub>), an organic substance derived from anthracene by oxidation with nitric acid or chromic acid. It is manufactured on the large scale by oxidising 50 per cent anthracene

produced in the distillation of coal-tar with sodium bichromate and sulphuric acid. The dried filtrate is heated at 100° with concentrated sulphuric acids, by which means the impurities are converted into soluble sulphuric acids, so that the pure A. may be separated out.

A. crystallises in light yellow needles, melts at 277°, and sublimes at higher temps. in sulphur-yellow prisms. Its commercial importance lies in the fact that it is an intermediary substance by which anthracene is ultimately converted into alizarin.

**Anthrax**, an acute, infectious disease, common to animals and man, caused by the *Bacillus anthracis*. It is also known as splenic fever, from the enlargement of that organ which invariably accompanies all types of A.

The disease is widely distributed as it affects animals, but appears to be particularly associated with marshy dists. There are 2 forms, external and internal. External A. is accompanied by malignant pustules in any part of the body, accompanied by fever. They rapidly attain a great size, general infection takes place, causing death within a few hours. Internal A. exhibits no reliable premonitory symptoms in animals; the first indication may be sudden death or staggering followed by convulsions. If death does not take place at once, ultimate recovery is possible. The only protective measure is inoculation with A. serum.

A. in man may also be external or internal. In external A. a small papule appears at the point of infection, which is usually a small wound on an exposed part. The papule increases in size, then breaks, leaving a dark blue or black scab. The area gradually extends, may be cast off if recovery occurs, but is accompanied by general disturbances comprising fever and prostration leading to ultimate collapse in unfavourable cases.

Internal A. is usually due to infected drinking-water or diseased meat. Indefinite symptoms, such as headache and languor, are followed by gastro-intestinal disturbances with bloody diarrhoea. Convulsions or spasms are followed by collapse. Certain cases of A. are traceable to particular occupations, such as woolsorters' disease, occurring among operatives in factories in which imported wool or hair, mostly from Russia and S. America, is sorted; and rag-pickers' disease, occurring among the rag-sorters in paper-mills near Graz. These latter forms affect the respiratory tract, causing septicaemic broncho-pneumonia, which is usually fatal.

Where cases of A. have occurred in animals, the hair, hides, wool, and bodies should be burnt. Disinfection of the premises and prohibition of grazing in the infected area should be made compulsory.

**Anthropoid Apes** (Gk. *ἄνθρωπος*, man, *ἰδος*, resemblance) is a term sometimes applied to large monkeys of the family Anthropomorphidae or Simiidae, on account of their morphological resemblance to man. They have no cheek-pouches

or tails, are arboreal and omnivorous. There are extinct and fossil species, but there also occur living species in the gorilla, orang-outan, chimpanzee, and gibbon, which are found in the E. Indies and W. Africa. See T. H. Huxley, *Man's Place in Nature*, 1863; R. Hartmann, *Anthropoid Apes*, 1883; R. M. and A. W. Y. Yerkes, *Great Apes*, 1929; Zuckermann, *Functional Affinities of Man, Monkeys, and Apes*, 1933.

**Anthropolatry** (Gk. *ἄνθρωπος*, man, *λατρεία*, worship), the payment of divine honours to a human being, a term always used in a condemnatory sense. The charge of A. was brought against the heathen by the early Christians, for, according to the pagan mythology, men had qualified themselves to receive divine honour. The same accusation was levelled against the Christians themselves by the sect of the Apollinarians (c. 400), a heretical body which refused to acknowledge the divinity of Christ.

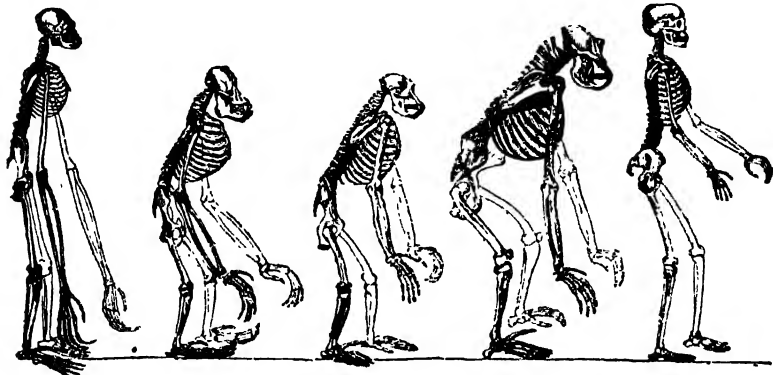
**Anthropology**, the study of man; a subject of great complexity involving the consideration of man's place in the animal kingdom as determined by his physical, mental, and moral characteristics, his hist. and development, the origin and growth of language, ethics, religion, and social institutions; the div. and subdiv. into races, nations, and castes, and all the manifold activities of which man is capable. Every fact has its value in throwing some light on the place and destiny of man in the universe; in this article it is proposed merely to indicate under certain headings the scope of the various divisions of the subject.

**Physical A. or somatology** deals principally with anatomical measurements. Such measurements may have 1 of 3 ends in view: to provide material for scientific classification, to test the efficiency of the individual for military or other service, or to aid in the identification of the individual in any registered class, such as the criminal. The attention of physical anthropologists has been taken up mainly with measurements of the skull. The reason is that man's distinctive characteristics as compared with other animals have had their expression in the modification of the shape of the skull. The assumption of the erect attitude caused a change in the relationship of the head to the cervical vertebrae, and the liberation of the hand relieved the jaws from much heavy work, so that the human jaw became reduced in size. The size of the brain increased with greater brain power, so that the state of civilisation of a race can to some extent be gauged by skull measurements. Too much reliance must not be placed upon observation of the shape of the skull, for it is notorious that in any group of civilised men all varieties of skull may be met with, but in taking a general survey, what is called the cranial index varies considerably for different races. The cranial index is obtained by measuring the greatest breadth and greatest length and computing what percentage the former is of the latter. When the

index is under 75 the skull is said to be dolichocephalic; between 75 and 80, mesocephalic; and over 80, brachycephalic. It is noteworthy that skulls of the different types are distributed generally over the world.

The discovery in China of what has been named the 'Peking Man' (*Sinanthropus*), a pre-Neanderthal skull, constitutes a valuable landmark in the hist. of human paleontology. This skull was found near the tn. of Chou Kou Tien, some 37 m. S.W. of Peking, in 1929, and 3 further specimens were revealed in the same cave in 1936.

that it was long disputed whether it should be classed with apes or with man; also with the Neanderthal (*q.v.*) skull, the longest known skull of an extinct type; and with the Piltdown skull. The better opinion seems, so far, to be that the discovery establishes beyond all reasonable doubt (1) that in Pleistocene times there were sev. genera of man all now extinct, or, in more appropriate words, which have left no descendants; (2) that these classes were all closely allied to the gorilla and that the necessary inference is that man and the great apes are not only descended from a common ancestor



SKELETONS OF THE GIBBON, ORANG, CHIMPANZEE, GORILLA, MAN

Photographically reduced from diagrams of the natural size (except that of the gibbon, which was twice as large as nature), drawn by Waterhouse Hawkins from specimens in the Museum of the Royal College of Surgeons.

As a guide to our knowledge of the descent of man, these challenge comparison with *Pithecanthropus* (see *PITHECANTHROPUS ERECTUS*), the Javan skull, and with *Eoanthropus*, the almost equally famous Piltdown skull which Charles Dawson found in portions, in Sussex, between the years 1911 and 1913 and in doing so discovered the remains of the earliest Briton known. (In 1938 Sir Arthur Keith unveiled a monolith memorial in the grounds of Barkham Manor, Piltdown, to mark the spot on which Charles Dawson found the fossil.) 'In many of his features Piltdown Man foreshadowed some of the structural modifications found in modern races of mankind. He came by such features independently, for discoveries of recent years had proved that diverse races of mankind had undergone the same structural change quite independently of each other. Through all his known parts there ran a similar vein in Piltdown Man, in his skull and brain as well as in his lower jaw' (Sir Arthur Keith, in 1939). According to the late Sir Grafton Elliot Smith, the Peking skull is that of an extinct genus of the human race, having affinities with *Pithecanthropus*, which latter goes back to so primitive an age

but have separated comparatively recently (as time is reckoned in geological terms). These deductions are consistent with the conclusions of Darwin and Huxley as opposed to the view that human and anthropoid stocks have been separated almost from the era when the common stock of man, anthropoids and all monkeys separated from other mammals. Summing up the evidence afforded by this Mongolian find, the late Prof. Elliot Smith states that we can say that while it presents features analogous to those of *Pithecanthropus* and the Neanderthal man, it belongs to a genus which is definitely distinct from both, but approximates more nearly to its Javan contemporary than to its relatively recent successor, Neanderthal man. The braincase is decidedly bigger than that of *Pithecanthropus*, but the features at the base of the skull (unknown, unfortunately, in the case of the Javan skull) show startlingly simian characteristics, which suggest a close affinity between the most primitive members of the human family and the anthropoid apes of Africa.

Many scientists, while not denying the received doctrine of descent, think that Darwin and Huxley were wrong in placing the gorilla and the chimpanzee

among the ancestors of man. The retort of Brit. biologists is that this misconception of the position of Darwin is a phase through which Eng. opinion passed before becoming reconciled to the strength of those evolutionists. The immense growth of knowledge in the last 50 years has furnished much fresh evidence in support of Darwin's theory, and Sir Arthur Keith, with other eminent scientists, are satisfied that the bases of his position cannot be shaken. Modern anthropologists have sought and found evidence of the immense antiquity of man in many quarters of the world, and this evidence goes to show that human beings, who used tools and had habits not unlike those of the surviving remnants of the lower races, existed for periods variously reckoned at from 200,000 to 1,000,000 years ago. Actual fossil remains seem to establish that there were sev. species of these primeval men, one of them probably the ancestor of modern man, the others all probably now extinct. In the matter of skull, skeleton, and brain, the older forms are more bestial than the later. A simple diagrammatic tree of the human pedigree omitting the 'missing link' between a gorilla or a chimpanzee and savage or primitive man as something never propounded by Darwin himself, but familiarised by his various interpreters, must, almost of necessity, be abandoned in favour of a longer, more complex, and at the same time more plausible family tree. Whether or no anthropologists will ever be able to trace with more marked precision the course of human descent from the Gordian knot of data at present available, seems doubtful.

Prior to the discovery of the 'Peking Man,' A. Hardlicka's *The Neanderthal Phase of Man* was the most significant recent event in the sphere of physical A. Hardlicka postulates only 2 major glacial movements for the 4 Pleistocene movements commonly accepted, and thinks that Neanderthal man existed towards the end of the intervening warm era. But the better opinion inclines to the view that man's ancestry is to be found before the Neanderthal man. (*Journal of the R. Anthro. Inst.*, 57, 249; *Science*, May 20, 1927.) The great number of fossil remains found in the Old World, assigning man to an anthropoid simian ancestry, is now accepted for the most part by Amer. anthropologists as pointing to his origin in this quarter. The only find indicating an early New World existence was the molar tooth found in Nebraska, which the scientist Osborn in 1922 supposed to be a new species, *Hesperopithecus*. But since then certain new finds have been declared by W. K. Gregory to afford conclusive evidence that *Hesperopithecus* was neither ape nor man, and that the Nebraska tooth belonged to an extinct peccary. This upset the best evidence for an Amer. origin, and receives still more cogent refutation from the Chou Kou Tien discovery. On the question whether the recent fossil remains found in S. Africa

(1947), and now assigned to the sub-family *Australopithecinae* (of the extinct group of primates, *Australopithecus* or the S. Ape), should be grouped with the *Hominidae* or with the anthropoid apes, see under MAN.

Practical or experimental psychology may be looked upon as a div. of physical A. Such observations are difficult to carry out, and usually require the co-operation of the individual experimented upon. The character of sensations, existence of colour-blindness of any kind, and rates of nervous impulse all provide data for any future system of race-culture. In addition to these spheres of inquiry may be mentioned racial and regional pathology, embryology, vital statistics, statistics of fertility and sterility. The subject of human biology, and evolution itself, must form part of physical A. It is obvious that no mere theorising on insufficient data will do much more than propagate errors, so that the work of anthropologists is mainly confined to the making of observations, the collection of statistics, and a general search for material, out of which future scientists may be able to build up a real science of A., which may have its value in directing the efforts of mankind towards a greater perfection, as far as the qualities which we know to be good are concerned.

*Ethnology*, or *Historical and Analytical A.*, deals with the general development of man in many directions as traced in written hist. and reliable deductions from written hist. Important among its branches is the study of sociology, which may be said to investigate the way in which communities have developed. Hist. gives us accounts of organised communities, but the business of sociology is rather to determine the causes which led to the survival of those organisations. Systems of govs. at various periods are analysed, showing how power is arrogated, or delegated by the consent of the governed. This leads to the discussion of the nature of what is called the 'social contract,' that vast mass of assumptions and unwritten laws which are necessary to make even a primitive society possible. It is desired to trace how these assumptions became valid, or rather how they emerged in the evolutionary struggle with other relationships between man and man. The development of the conceptions of duty and right seems to have progressed along the parallel lines of ethics and law, with their occasional divergence and rarer convergence under the stimulus of religious inspiration. The application of the idea of evolution is of great value in the study of sociology as of A. generally, but there are dangers which such evolutionists as Spencer, Wallace, and Huxley did not escape in dealing with the growth of ethical ideas. The tendency of the sociologist is often to dogmatise on the absolute value of social qualities, whereas such an inquiry as we are discussing should be, in the main, limited to determining the course and causes of man's development up to the present. Such doctrines as the modern

'eugenics,' for example, must not be looked upon as the legitimate offspring of evolutionary sociology, for it is shown that even physical qualities, and still more moral qualities, are transmitted from age to age across great distances, and are not dependent upon the efficiency of the individual. Certain special aspects of social relationships need to be studied, such as the development of marriage laws and conventions, and restrictions as to consanguinity, the grouping and separating effects of war, commerce, and colonisation. In dealing with these latter, sociology must go still deeper than history: it has to estimate the effect of war on the social relationships of the conquered as well as the conquerors, to trace perhaps, where an apparently obliterated social tendency recurs in a mixed people, the result of a fusion of the victors with the defeated. It is to be observed that the anthropologist has to deal with the individual as well as the social organism, and the correcting influence of either study may save him from the liability to error of the sociologist as such.

Technology is a branch of ethnology involving the study of the origin and growth of the utilitarian and aesthetic arts. Among savage races we can find the rudimentary tools and appliances which have become elaborated into the mechanisms of the civilised world. The original tool was probably a stone or cudgel which was used indifferently for digging, striking, piercing, grinding, or cutting. The way in which this primitive tool becomes differentiated is illustrated in the objects associated with the stone, bronze, and iron ages, as well as in the appliances of savage tribes of our own day. Such a development as the means of transport can be traced by survivals in the United Kingdom alone. The earliest means of transport was of course the 'human beast of burden,' carrying or dragging, after which animals were pressed into the service. In Scotland, Ireland, and Wales there are still to be found carts without wheels, ranging from a single pair of poles to a vehicle with a permanent receptacle for goods. The built-up wheel was a later development which led naturally to a considerable increase in size. Other branches of technology can be studied by reference not only to ancient accounts and drawings, but also to curious survivals of our own day, due in some cases to peculiarities of circumstances, and in others to the fact that even in highly civilised countries there are some secluded spots which have escaped the struggle for survival, and which therefore preserve ideas and contrivances which have long been obsolete elsewhere.

The study of religion is of prime importance in ethnology. It is desired to investigate the psychological origin and development of religion: personal, family, tribal, and world religions: animism, fetishism, polytheism, monotheism, and atheism; mythology and mythogeny; symbolism and religious art, sacred places

and objects; rites, ceremonies, and mortuary customs; religious teachers, classes, and doctrines; theocracies; analysis of special religions; philosophy and natural list of religions.

Psychologists, particularly in Germany, have long been engaged in seeking to explain religion by the phenomena of mind, and to trace it back to its origin. Comte described the primitive religious feeling as the consciousness which man has of the life in him being shared by all external bodies. It has been suggested that the consciousness of life in man and animals as distinct from inorganic matter first gave the idea of a higher power or potency. Some, like Grant Allen, have thought that the phenomenon of death first stimulated the idea of 'something, not ourselves' which may depart without any visible sign, and that worship really started with the idea of propitiating the thing that might come back and resume its power over the body. To this fear was attributed also the origin of putting cairns or large stones over the corpse to make it secure. That the religious feeling originated at a very early stage in man's conscious life is evident from the fact that no savage tribe of to-day, no matter how low their organisation, appear to be absolutely devoid of a religious idea.

Yet another branch of ethnology is the study of linguistics. This may be divided up into the following fields for research: gesture and sign-language, spoken language, parts of speech, logic of grammar, origin, growth, and classification of languages, relation to ethnography; written language, pictographic, symbolic, ideographic, and phonetic writing, evolution of alphabets, phonetic systems; forms of expression, poetic (metrical and rhythmic), dramatic, and prosaic.

The importance of language in the development of the human race cannot be overestimated. It is here that evolution is most gradual, and least susceptible to acute crises amongst all the records of human progress. Changes there are in plenty, but they follow such well-recognised tendencies that language may be said to be a science with definite laws, and the evidence of language is of great value in determining past movements of masses of the human race. The origin of language undoubtedly was the desire for communication, and it is the possibility of communication in fairly definite terms which has enabled man to inherit from his predecessors their stores of knowledge and to co-operate with his contemporaries in all those forms of collective activity which are increasingly characteristic of man's development. Communication can be established by pictorial illustration (the origin of writing), by gestures and movements of the face, and all these have been employed and are still employed by certain sections of mankind. But the greater economy of the voice, the fact that speaking left the hands free to be engaged in other work, favoured that means of communication in preference to any other. How far

imitation was the directing principle in the production of the first words is difficult to estimate; probably most language originated in conventional expressions with any sort of authority, evolution deciding which should survive. In graphical illustration, imitation is less difficult and more expressive, but even here we find the need for economy gradually determining the evolution of the picture into a conventional symbol; and the restriction of the number of symbols to an alphabet is simply the result of the recognition of the possibilities of the permutations and combinations of a limited number of symbols.

Ethnology also includes the study of folklore, embracing traditional customs and narratives, folk-sayings, superstitious beliefs and practices. The origin of many traditional narratives may undoubtedly be found in myths explanatory of religious and natural phenomena. The philological school of folklorists made the mistake of associating the folk tradition with the myth when the connection had long ceased to exist. In their development through different ages and peoples folk traditions have received sundry additions and undergone many modifications, sometimes with and sometimes without a parabolic intention. The foundation of the Folklore Society in England in 1878 did much to stimulate the collection and comparative study of folklore in this and other lands.

*Ethnography* includes the study of people on a geographical basis, and is therefore closely allied with ethnology. It may be divided into *general ethnography*, which discusses the origin, characteristics, and sub-divs. of races and peoples, 'geographical provs.' or 'areas of characterisation,' anthropo-geography, and lines of migration and national intercourse; and *special ethnography*, which divides up the races for special study, as the Eurasiatic or white race (N. Mediterranean and S. Mediterranean branches); the Austriatic or black race; the Asian race (Sinitic and Sibiric branches); the Amer. race; insular and littoral peoples (Negritic, Malayic, and Australic stocks).

The colour of the complexion or of the hair and eyes, the blood group, the conformation of the cranium, nose, jaw, or the skeleton generally, and tests of mental capacity or the accuracy of the senses have all been suggested at various times as means of differentiating racial groups. Colour is the most conspicuous of all criteria and Linnaeus (1707-78) made this the basis of his div. Until 1900 all broader ethnographical classifications followed these lines. The work of Deniker and F. Müller, however, introduced a change, and in the most recent scientific classification the characteristic types of hair are regarded as more important than skin pigmentation. The so-called 'racial science' exploited for political ends in recent years has its roots in a scientifically untenable identity between race and language ('Aryan,' 'Germanic'), and it should be the aim of every true scientist to oppose this practice.

In many ways ethnography will only differ from ethnology as being a scheme of attack, and anthropologists have found that the method of selecting one area for exhaustive study has been productive of good effects, and a good collection of anthropological material, accurate in detail and free from rash generalisations, is rapidly being accumulated. Among special considerations in ethnography may be mentioned the necessity for acclimatisation and the influence of climate on races, individuals, and institutions.

The last great div. of the subject is *Archæology*, which deals generally with antiquities, especially with material remains. General archæology deals with the geology of the epoch of man, glacial phenomena, diluvial and alluvial deposits, physical geography of the Quaternary, prehistoric botany and zoology; the prehistoric ages, the Stone (Palæolithic and Neolithic), Bronze, and Iron Ages; prehistoric commerce, palæoethnology, and the proto-historic epoch. The chief sub-divs. of special archæology are Egyptian, Assyrian, Babylonian, Chinese, Græco-Rom., medieval, and Amer. archæology.

Numerous societies are now in existence for the purpose of archæological research, and, although the study was originally looked upon as a mere aid to the elucidation of classical literature, and afterwards as a means of recovering objects of great artistic value, its place in the science of A. is now assured. Many stages in the development of savage races of modern times have been well illustrated by objects recovered from the Stone, Bronze, and Iron Ages, for it must not be forgotten that in the present time there are peoples who have not yet emerged from what is often looked upon as a purely prehistoric condition. See also *EVOLUTION; MAN*.

*Bibliography.* GENERAL: T. H. Huxley, *Evidence as to Man's Place in Nature*, 1863; A. H. Keane, *Man, Past and Present*, 1899; E. B. Tylor, *Primitive Culture*, 1903; A. C. Haddon, *A History of Anthropology*, 1910; G. Elliot Smith, *The Diffusion of Culture*, 1933; E. D. Chapple and C. S. Coon, *Principles of Anthropology*, 1948. PHYSICAL A.: A. C. Haddon, *The Wanderings of Peoples*, 1911; Sir Arthur Keith, *Antiquity of Man*, 1925, and *Ethnos, or the Problem of Race*, 1931; G. Elliot Smith, *Human History*, 1930; W. E. Le Gros Clark, *Early Forerunners of Man*, 1934; Ruth Benedict, *Race and Racism*, 1942. SOCIAL A.: Sir J. G. Fraser, *The Golden Bough* (abridged ed.), 1922; W. J. Perry, *The Origin of Magic and Religion*, 1923; E. Westermarck, *A Short History of Marriage*, 1926; J. R. Firth, *The Tongues of Men*, 1937. MATERIAL CULTURE: Brit. Museum, *A Guide to the Ethnographical Collections*, 1925; T. A. Riebard, *Man and Metals*, 1932; R. U. Sayce, *Primitive Arts and Crafts*, 1933. ARCHÆOLOGY: W. B. Dawkins, *Early Man in Britain*, 1830; J. L. Myres, *The Dawn of History*, 1911; M. C. Burkitt, *Our Early Ancestors*, 1926; V. G. Childe, *The Dawn of European Civilisation*, 1939.

**Anthropomorphism**, a word of modern adaptation, signifying the attribution of human physical and moral qualities generally to God or the gods. The most recent extension of the word is by psychologists to denote the principle according to which man is said to interpret all things through himself.

**Anthrophophagi**, a tribe of cannibals mentioned by Pliny as inhabiting a region near the Caspian Sea. They pursued the custom of eating the flesh of their aged parents in order to preserve the ancestral soul from decay.

**Anthropophagy**, see CANNIBALISM.

**Anthus**, name given by Bechstein to the pipit or titlark, of which genus there are many species. It has a slender body, notched and fairly long beak. It resembles the *Alauda*, or lark, and is related to the wagtail. The meadow, tree, and rock pipit are those best known in Britain.

**Anti-Aircraft Defence.** A.-A. D. existed in the First World War and, by 1918, consisted of under 300 guns, about 375 searchlights, and a dozen fighter squadrons. After the war, in 1922, 4 heavy A.A. brigades and 2 searchlight battalions were formed, all for London. But it was not until 1936, when the political horizon began to darken, that there was a complete A.A. Div.; and by 1938 there was a corps of 5 divs. In the year in which the Second World War broke out there were 7 divs. forming a command. A year later a formidable artillery manned by skilled gun-crews was available against the attack by the Ger. Luftwaffe. In 1943 the A.A. Command, under Gen. Sir Frederick Pile, had 2 main research stations, employing large numbers of scientists, and progress in research was very marked. An integral part of the A.A. Command was the Royal Observer Corps, the duties of which included listening with headphones and the use of a plotting instrument (or circular dial, marked with numbers and squares), on top of which is an altitude finder. These observations were reported into the telephone to a centre, the mouthpiece of the phone being fixed over the listening observer's chest. At the centre 'tellers' charted the progress of the reported aircraft, and as raiders passed out of the area of the centre the neighbouring centres were warned of their approach. The whole A.A. Command was a network of communication working in conjunction with the Royal Corps of Signals. Every gun and searchlight site was connected with its gun-operations room and the neighbouring site. Gun and light sites, observer posts, operations room, fighter sectors, and air fields were all interconnected in a labyrinth of phone cables, supplemented by radio and dispatch riders. The Royal Army Ordnance Corps supplied and maintained all the guns and instruments, lights, and generating sets of the A.A. Command.

Experience in the Second World War showed that though A.A. guns destroyed numerous raiding aircraft, the value and effect of A.A. gunfire was, generally

speaking, to keep hostile aircraft at a great height, and to prevent them from following a straight and even course necessary for accurate bombing. An important function of A.A. guns is also to indicate the position of hostile aircraft to fighters, which is done by firing rounds to burst as near as possible. Sev. times Brit. A.A. gunners shot down more than 50 Ger. planes over Britain in a week. On Aug. 15, 1940, they destroyed 23. In the first 2 years of the war some 600 were shot down by A.A. fire over Britain (as against 4000 shot down by fighter planes). In the closing stages of the war A.A. guns were most successful in winging or destroying in mid-air flying bombs projected from sites in France and the Low Countries. (See FLYING BOMB.)

The chief types of heavy A.A. guns in the war were: 4.5-in., which fired a high-explosive shell of nearly 56 lb. to a height of 8 m. in 50 sec.; and the 3.7-in. with a faster rate of fire, but a smaller shell. There were, too, 3-in. guns firing high-explosive or shrapnel shell every 3 sec. The Bofors light A.A. gun weighs 2 tons and fires anything up to 120 2-lb. shells a min. to a height of 6000 ft., bursting on impact. Lewis guns (from the previous war) proved effective against low-flying raiders. At a heavy-gun site there were normally 4 guns run by a half battery divided into 2 sections and the 2 sites might be sev. m. from each other. The guns were spaced around the sides of the gun park, and at the centre was the command post containing the predictor, the identification (or spotter's) telescope, and the height-finder. The post was in the charge of a position officer, who controlled the firing, and was responsible for identifying doubtful aircraft. He was assisted by a non-commissioned officer, who relayed his orders to the gunner. An approaching plane is first seen through the spotter's telescope. The height and bearing of the approaching craft are shouted out from the scales at the base of the telescope. A skilled gun-position assistant does not read out the height and bearing registered on the scales, but makes the necessary adjustment for a moving target. The predictor is a calculating machine which finds out the location of the aircraft, and predicts its future movements, so that allowances can be made in laying aim; and its calculations are based on information provided by the layers and partly by the height-finder, which can tell both the height of the plane and its distance from the gun-site.

The predictors transmit all necessary gunnery data, electrically, to dials on the gun, and no gun sights are used, the layers merely keeping the gun laid by following up the indications on the dials. The target is small, and so direct hits with the heavier projectiles cannot be expected, and it is necessary to rely on placing a high-explosive burst near the aeroplane to achieve effect; in the case of the low-flying aeroplanes the opportunity is so fleeting that a spray effect from a machine-gun is the only possible method of engaging it. The A.A. gun must be

capable of firing at all angles of elevation from 0° to 90°, and must have all-round traverse. The elevating and training gears must be such that the gun can be moved rapidly and smoothly, as firing is continuous once the target has been engaged, and the layers must keep the gun pointed in the right direction all the time; there is no deliberate laying and firing shot by shot, as in other forms of artillery. Owing to the speed of the target, saving of time is all-essential. Breech mechanisms must be automatic, and the muzzle velocity and ballistic efficiency of the projectile must be great, so as to reduce the time of flight to a minimum. The ammunition must be fitted with a very accurate time-fuse, as an error of one-tenth of a second causes an error in space of about 50 yds. Rates of fire are as high as 25 rounds per min. for the 3-in. gun; the target may move more than a m. between the time the gun is fired and the time the shell bursts. Searchlights (q.v.) are of great assistance to night-fighters. They indicate to them the position and course of hostile aircraft. Searchlights also expose their lights to direct to their bases home-coming aircraft which have lost their bearings. They also mark enemy mines which fall in estuaries, which they do by taking the bearing and so co-operating with mine-sweepers. Finally there are balloon barrages. The conception of balloons as a weapon of air defence began even before the First World War, the balloon aprons or nets operating as a kind of stockade against hostile planes. The stockade idea was abandoned before the Second World War and the new balloon barrage was conceived as flexible, each balloon being independent and mobile. The usual type of barrage balloon is a streamlined bag of rubber-proofed cotton fabric, with a gas capacity of 19,000 cub. ft., 63 ft. long and 31 ft. high, and weighs 550 lb., and is flown on a flexible steel cable, and can be raised in under 20 min. See also RADAR (or RADIOLOCATION).

**Antiarin** ( $C_{17}H_{15}O_6 + 2H_2O$ ), the active principle of *Antiaris toxicaria* or *Upas antiar*, a Javanese poison tree. It is intensely poisonous and is used as an arrow-poison.

**Antiaris**, botanical name of a genus of trees of the order Moraceae found in the E. Indies. The *A. toxicaria* is the upas-tree of Java, which contains a deadly poison. The is. contains volcanic valleys which emit carbonic acid gas, fatal to animals and plants.

**Antibes**, an ant. fortified seaport and health resort in the Fr. Riviera, 12 m. S.W. of Nice. It has some tobacco factories, and grows oranges and olives. Pop. 26,000.

**Antiburghers**, a name given to those members of the Secession Church of Scotland who in 1747 condemned the burgess oath, and formed the General Associate, or Anti-burgher, Synod.

**Antichrist**. It follows from the duality of the universe, a duality in which every positive has its negative, that the figure of Christ should, as the shadow follows

the sunlight, be accompanied by the idea of A. The use of the word shadow here is no chance metaphor, for though the word or words implying the idea of A. is common enough in the Jewish and the early Christian sacred writings, the anti-Messianic power is very shadowy and indeterminate. Part of this is doubtless due to the dual meaning attached to the Gk. preposition *anti*, a word implying both substitution and opposition. Thus the A. may be either a false claimant to the Messiahship or an opponent of the true Messiah. Much of the importance attached to the concept of A. in the early Christian writings arose from the fact that the idea of A. was bound up with the imminent second coming of Christ, an idea which so obsessed the early Church. With the gradual decay of the belief in a speedy second advent the idea of A. also receded in importance, and to this day the Rom. Catholic Church has never decided anything concerning his hist. or even his existence. Such a reluctance to apply the term definitely has not characterised the Protestant reformers. With Luther they did not hesitate to apply this appellation to the pope, and such a declaration is embodied in the Schmalkald articles and later in the Westminster Confession of Faith. Such an attack brought its natural reaction, in which Luther was declared by some Catholics to be A. or the 'Man of Sin.' Mohammed, the Grand Turk, and both the Napoleonic emperors of France have been identified with A. In the N.T. the word occurs only in the Epistles of John (1 John ii., 18 and 22; iv. 3; 2 John, verse 7), and here it has the significance of an antagonist to Christ, but in the synoptic gospels is found the older or Jewish conception of A. as a false Messiah. It is curious to reflect that while the Jews, especially in their later rabbinical books, regarded A. as one who should arise among the Gentiles and whose presence and teaching would be inimical to the faith and race of Israel, on the other hand Paul the apostle, who had to bear the brunt of Jewish opposition to the new faith, and other early eschatologists personify A. as a Jewish pretender. Thus to the devout Judaist A. was known as Armilos, or Armillus, an equivalent for Romulus, i.e. Rome. The early Christians, struggling for their belief against their Jewish persecutors and believing in the early return of the Founder of their faith, gave ready ear to prophecies which depicted A. as a Jew, who should rebuild the Holy City and by his signs and wonders gain the allegiance of the multitude. Enoch and Elijah should with a faithful few withstand the pretensions of this false prophet; and in the end he should be finally overthrown by the true Christ. It is against this impostor that Paul warns the Thessalonians in his second epistle to them (2 Thess. ii.). The march of time brought with it the persecution of both Jews and Christians by imperial Rome, and the role of A. was attributed by both parties to the mad Caligula and the fiendish



Nero. Thus Rome was bound to be the fourth kingdom foretold by Daniel, and in the then growing apocalyptic literature of both religions the dragons and beasts therein described came naturally to be associated with the persecutors of their faiths. The number of the Beast '666' (Rev. xiii. 18) was identified with Nero by the Christians. Finally, it is necessary to emphasise the fact that A. is not depicted as Satan himself, but merely the human representative of Satan, as Christ was of God.

**Anticlimax** is a rhetorical figure in which the expressions, after rising in intensity, suddenly fall to a lower level, producing a ludicrous effect. It is allied to bathos and opposed to climax.

**Anti-Comintern Pact.** This pact was signed by Germany and Japan in Berlin on Nov. 25, 1936, being, ostensibly, an agreement for mutual defence against Communist subversive activities. In its preamble, the agreement refers to the aim of the Communist International, known as the Comintern, to disintegrate and subdue existing states by all the means at its command and records the conviction of the signatories that the interference by the Communist International in the internal affairs of the nations 'not only endangers their internal peace and social well-being but is a menace to world peace.' By the first of the three articles of the agreement, the 2 countries agreed to inform each other of Communist activities and to collaborate in preventive measures; by the second article they agreed jointly to invite other states, whose internal peace was threatened by the International, to come into the agreement; and by the third article the agreement was to remain in force for 5 years 'but before expiration the parties would come to an understanding for the further method of their co-operation.' In a supplementary protocol the parties agreed that their competent authorities should 'within the framework of the existing laws take severe measures against those who at home or abroad were engaged in the service of the Communist International or promoted its subversive activities.' In Jan. of the following year a standing committee was formed under the terms of the pact 'to consider and discuss the further defensive measures necessary for the struggle against the subversive activities of the Communist International.' On Nov. 6, 1937, Italy announced that she had joined the pact and the supplementary protocol, Count Ciano saying: 'With the signing at Rome of the three-power pact, three great nations engage themselves against the snares of Bolshevism. The pact has no hidden aims. It is directed against no one and is open to all states which wish to associate themselves with it. It is an instrument placed at the service of peace and civilisation, which Fascism intends to safeguard against all menaces.' The Soviet at once informed Italy that her adherence was contrary to the Russo-It. agreement of 1933

and was an unfriendly act (under that agreement each country undertook to continue its policy of reciprocal non-interference in the internal affairs of the other; not to take up arms against the other; to remain neutral in any war between the other and a third power; and to abstain from any political agreement with a third power calculated to prejudice the other). Nothing, however, came of this protest and a year later (Jan. 1939) Hungary joined the pact and, still later in the year, Franco's Sp. Gov. also joined. Public opinion in the W. democracies condemned the pact as a thinly disguised alliance, designed, not to combat a comparatively innocuous body, but to pursue, in common, a policy of aggression against any states which might not be able to resist absorption—in short, a pact to overawe and dominate the world—the other adherents being merely catpaws. It is true that in the years following the close of the First World War, the Soviet directed a continuous stream of propaganda against capitalist countries—particularly against Great Britain—and continued to do so even after undertaking to cease such activities; but while, in its inception, the A.-C. P. may conceivably have been actuated by a desire to crush Communism, the success which attended the aggressive policy of Japan, Italy, and Germany against defenceless countries convinced the 'Western democracies'—as they were now derisively described in the totalitarian press of Germany and Italy—that the pact had long since lost its original *raison d'être* or pretext and was now a barely disguised military alliance between, at least, Germany and Italy—with the possibility that Japan would only be restrained from participation in joint aggressive action against the W. powers if overawed by America. In the course of 1939 Germany and Italy announced that they had effected a military alliance but, as was anticipated, Japan declined to join the alliance, the reasons for her abstention being the movement of the U.S. fleet from the Atlantic to the Pacific during the crisis consequent on the rape of Czechoslovakia, and the negotiations between Great Britain and Russia for a mutual pact of defence.

The Russo-Ger. treaty (Sept. 29, 1939) was a severe rebuff to Japan for apparently it stultified the A.-C. P., though the terms of the pact were as vague as they were menacing, and therefore might mean much or little. Japan and Germany were, however, brought into some kind of alliance by the pact of Berlin (q.v.), and Germany even invited Russia to join this alliance; but the Kremlin had not forgotten the A.-C. P. The Fascist powers had always made considerable propagandist use of the 'threat' of the Comintern and its Communism, whereas, in fact, the role of the Comintern had been declining ever since the early days of the Russian revolution. The Kremlin now (1943) at length appreciated that the Comintern was more of a liability than

an asset to the Soviet Union, at least while prosecuting the war, and accordingly it was dissolved by a resolution of the executive committee of the Communist International, at Moscow (May 15, 1943)—an astute move and one which was evidently disconcerting to the Axis.

**Anti-Corn Law League** was formed in 1838-39 at Manchester. Its object was to effect the repeal of the corn laws in Britain. The cause was promoted by oratory and by a special paper called *The League*, and among its leading supporters were Cobden, Bright, and Villiers. It dissolved itself when its object was achieved in 1846-49.

**Anti-corrosive**, a material employed to prevent the rusting of iron when exposed to moisture or other harmful influences. As. are of 2 classes: protective, such as an application of hot tar or some magnetic oxide of iron; and galvanic, such as a coating of zinc or some other electropositive metal to which the corrosion is transferred.

**Anticosti**, an is. in the gulf of St. Lawrence, which it divides into 2 channels. It is low-lying and sterile, though there are considerable salmon, trout, and herring fisheries, and seal and bear hunting. It is 140 m. long and 30 broad. In 1896 it was purchased and stocked as a game preserve by M. Menier.

**Anticyclone**, an atmospheric system marked by an area of high barometric pressure, caused by descending air, and surrounded by circular isobars. The descending air becomes warmed and dried, and transmits radiation freely. Hence anticyclonic weather is marked by clear air and frost in winter and by blue sky and heat in summer, with heavy dews. The centre of the system is calm, but winds blow out from it spirally, in the N. hemisphere in the direction of the hands of a watch, and in the opposite direction in the S. hemisphere.

**Anticyra** was the name of 3 tns. of ant. Greece, 2 of which were noted for hellebore, the ant. remedy for insanity.

**Antidotes**, medicines that relieve or remove the symptoms caused by poison. An A. may be *chemical*, i.e. one that changes the nature of the poison so as to make it insoluble or harmless; *mechanical*, i.e. one that prevents absorption by holding the poison in mechanical suspension, or by coating the stomach; or *physiological*, i.e. one that counteracts the physiological effects of a poison. A *universal A.* is provided by mixing 1 part of dissolved iron sulphate with 2 parts of magnesia water.

To mineral acid poisons, alkalis are A. The most suitable are lime, soap, chalk, potash, soda, or magnesia; they should be moderately diluted with water. Freshly precipitated oxide of iron, followed by a solution of potassium carbonate, is to some extent a chemical A. to prussic acid. Atropine is an A. to aconite, hellebore, veratrine, and morphine. Weak acids such as vinegar are A. to alkalis. Tannin or tea, charcoal, and morphine are A. to atropine and belladonna. Epsom salts and Glauber's

salt are A. to carbolic acid. Potash and injected atropine or strychnine are A. to chloral. Egg albumin and milk form an A. to copper salts. Ammonia is antidotal to formalin. Zinc sulphate is an A. to lead salts. Potassium permanganate is an A. to opium or morphine and to strychnine if immediately administered.

**Antietam**, a narrow but deep riv. in Maryland, U.S.A., flowing into the Potomac. A prolonged battle was fought on its banks between the Federals and the Confederates in Sept. 1862. The former were victorious, but with the loss of 13,000 men.

**Antifebrin**, *acetanilide* (chemical symbol  $C_6H_5NHCOCH_3$ ), a crystalline substance obtained by acting on aniline with glacial acetic acid. It is an analgesic and anti-pyretic, though it is undesirable to use it when the fever is prolonged, as its effects pass off so quickly. It quickly relieves the pain of migraine and neuralgia, and is the chief or only constituent of many advertised 'head-ache powders,' etc. It is liable to produce alarming symptoms, such as gasping respiration, cyanosis (darkening of the skin through deficient oxidation of the blood), and collapse, but these usually pass off if hot drinks and stimulants are administered.

**Antigo**, cap. tn. of Langlade co., Wisconsin, U.S.A., 203 m. N.W. of Milwaukee. It is a banking city, and contains locomotive works, foundries, and factories for wooden and iron goods. Pop. 8600.

**Antigone**, in Gk. mythology, a daughter of Oedipus and Jocasta. She accompanied her father into exile at Colonus. After her father's death she went to Thebes, where Hemon, son of Creon, the king, fell in love with her. Her brothers, Eteocles and Polyneices, slew each other in single combat, and A., disregarding Creon's edict, buried Polyneices. As a punishment she was shut up in an underground cave, where she afterwards hanged herself. Hemon, her lover, in despair put an end to his life.

Gk. tragic poets have used her life and character as a subject for many of their works. Sophocles immortalised her in *Antigone* and *Oedipus at Colonus*. Euripides also used the theme in his *Phaenician Women*, but the discrepancy with Sophocles' version should be noted.

**Antigonish**, cap. tn. of co. of same name, Nova Scotia. It is the seat of the Catholic bishop of Arichat, and contains St. Ninian's Cathedral and the large college of St. Francis Xavier. It is a banking tn., a port of entry into Nova Scotia, and a distributing centre for a large agric. dist. The harbour on St. George's Bay is navigable by small vessels. Pop. 2150.

**Antigonus** (382-301 B.C.), known as Cyclops (the one-eyed), one of the generals of Alexander the Great. In the div. of the kingdom after Alexander's death he received Pamphylia and Lycia. He was forced to flee into Greece, and found favour with the regent of Macedonia. On the death of Antipater the

regent, he determined to win the lordship of Asia. He became lord over Asia Minor and Syria. He assumed the title of king in 306 B.C. He failed in an attempt to invade Egypt, and fell in a decisive battle at Ipsus in his eighty-first year.

**Antigonus** of Carystus in Euboea. A Gk. writer of the third century B.C., in the age of Ptolemy II. of Egypt. He spent most of his early life in travelling. He was summoned to the court of Attala I. of Pergamum. His chief works were the *Lives of Philosophers* and *Collections of Wonderful Tales*. This collection, which on the whole is of very little value, was ed. (1799) by J. Bechmann, with a commentary; and by Keller (1877).

**Antigonus Doson**, king of Macedonia, was grandson of Demetrius Poliorcetes. He assumed gov. on the death of Demetrius II. in 229 B.C. and married Chryseis, the queen-mother. His reign was a critical period in the hist. of the interaction of the Gk. states. He co-operated with Aratus and the Achaean league against Cleomenes, king of Sparta, invaded Laconia in 221 B.C., and by the victory of Sellasia made himself master of Sparta. He repelled an invasion of the Illyrians in Macedonia. He d. a few months later in 220 B.C. The appellation, 'Doson' (Gk. *δωσω*, going to give) satirically marked his readiness to promise and slowness to perform.

**Antigonus Gonatas** (319-239 B.C.), Macedonian king, grandson of A. Cyclops and son of Demetrius Poliorcetes. He did not obtain immediate possession of the throne, but assumed the title of king, and after waiting 7 years celebrated his accession. Pyrrhus drove him from his kingdom in 273 B.C., but he recovered it in the next year and retained possession of it until his death.

**Antigua**, one of the W. Indian Is., is a Brit. possession, forming with Barbuda and Redonda one of the 5 presidencies of the Leeward Is. It was discovered by Columbus in 1493, settled by the Eng. in 1632, made a bishopric in 1842. It is the seat of gov. of the Leeward Is. It became a crown colony in 1898. Suffered severe damage from hurricane, 1929. Chief tns., St. John, Falmouth, and Parham. The Is.'s natural harbours are St. John's, English, Falmouth, Willoughby, and Parham. Sugar is cultivated, and molasses, tamarinds, and pineapples are exported. Area, 108 sq. m. Pop. with dependencies, 41,000. The Is. was named by Columbus after the church of St. Mary of A., Seville. It is an Is. of rocky caves and dense thickets of thorny underwood, and many are the legends associated with its picturesque ravines, intricate mt. paths, and dangerous shores lined with coral reefs. The settlement of A. is associated with the name of Sir Thomas Warner, whose son Edward led a party of Eng. colonists from St. Kitts (q.v.) to A. in 1652, and was made the Is.'s first governor by his father. Later the Is., together with the other Leeward Is., was included in the patent granted to Lord Carlisle, the lessee of which grant was

Francis, Lord Willoughby. Willoughby governed the Leeward Is. from Barbados, relinquished control in 1652, but returned after the Restoration and governed till 1666, when he was lost at sea. In 1666 Fr. troops, together with some Irish malcontents, landed at Five Is. Bay and took possession of A.; but in 1667 it was ceded to England by the treaty of Breda. There were soon after the cession only 500 black people on the Is., while a century later the pop. included nearly 39,000 slaves, 1230 free people of colour, and 2600 whites. In 1689 the inhab. of Anguilla (q.v.) sought refuge in A., which was defended from Fr. and Carib attacks by Sir Timothy Thornhill. The notorious Daniel Parke became governor in 1706. Violent differences occurred between him and the inhab., but he refused to resign and was at length killed by an infuriated mob on Dec. 10, 1710.

It was at Eng. Harbour that Nelson hauled down the broad pennant of Commissioner Monray, on the ground that he, Nelson, as captain of the *Boreas*, was senior officer of the station. At Indian Warner, in the hilly dist. between Willoughby Bay and Eng. Harbour, there is a vault in which Col. Thomas Warner and others of the Warner family were buried. It is situated near the ruins of the old Great House. 'Indian Warner' was the common appellation of a natural son of Gen. Sir Thomas Warner by an Indian woman, and he was so called to differentiate him from Col. Philip Warner, another and legitimate son of the general. Col. Philip Warner slew his half-brother and had to go home to stand his trial for murder, but was acquitted.

William Dampier, *Voyages and Descriptions*, 1699; Capt. Thomas Southey, *Chronological History of the West Indies*, 1827; *Antigua and the Antiguans*, 1844; V. L. Oliver, *History of the Island of Antigua*, 1895-99; C. Manington, *The West Indies*, 1925.

**Anti-Jacobin**, or **Weekly Examiner**, an Eng. paper founded by George Canning and his friends to express their opposition to the principles and policy of the Fr. revolutionaries. The chief contributors were Canning, George Ellis, and John Hookham Frere, the paper being ed. by William Gifford (q.v.). It lasted from Nov. 20, 1797, to July 9, 1798.

**Antilegomena** (Gk., contradicted), a term applied to certain books of the N.T. whose inspiration was not at first universally acknowledged by the Church. The books were the Epistles of James, Jude, 2 Peter, 3 John, Acts of Paul, and the Apocalypse. The name was given in contrast to the other books, which were called Homologoumena (agreed to).

**Antilibanus**, or **Anti-Lebanon**, a mt. range of Syria, inferior in height to Lebanon, with which it runs parallel, and from which it is separated by the valley of Cuele-Syria. Its highest peak is Mt. Hermon, which is 9050 ft. high.

**Antilles**, a name sometimes applied to the whole of the W. Indies, sometimes to the 2 large groups, the Greater A. and the Lesser A., or Caribbean Is. The

Greater A. comprise the largest is., namely Cuba, Jamaica, Haiti, and Puerto Rico, as well as the small is. near their coasts. The Lesser A. comprise the Windward and Leeward Is., with the Virgin Is. (Anegada). For further information of the A., discovered by Columbus, see under the various names above mentioned.

**Antilocapra**, or **Prongbuck**, a N. Amer. ruminant, somewhat resembling the antelope, but differing from it in having deciduous branched horns. The genus is also characterised by the absence of lateral hoofs. The animal stands about 3 ft. high.

**Antiochus**, in Gk. mythology, the son of Nestor, king of Pylos, whom he accompanied to the Trojan war. He was famous for beauty, swiftness, and skill, and was the friend of Achilles, who avenged his death when he fell in saving Nestor from Memnon. He was buried, together with Achilles and Patroclus, on the headland of Sigeum.

**Antilogarithm** is the number corresponding to a logarithm. Thus 100 is the A. of 2, because 2 is the logarithm of 100.

**Antimachus**, Gk. epic poet of the latter part of fifth century B.C., b. at Colophon, and a friend of Plato. His works, which show great erudition but little talent, include an epic *Thebais*, highly esteemed by Alexandrine critics, and an elegiac cycle, *Lyde*. The *Thebais* was ed. by Kinkel in *Epicorum Græcorum Fragmenta*, vol. 1., 1877, and *Lyde* by Bergk in *Poetæ Lyrici Græci*, 1843.

**Antimilo**, a small is. situated to the N.W. of Milo (anc. Melos) in the Grecian archipelago.

**Antimony**, a chemical metallic element (symbol Sb, atomic number 51, atomic weight 121.2) occurring in nature chiefly in combination with sulphur as stibnite, antimonite, or A. sulphide, Sb<sub>2</sub>S<sub>3</sub>. Other A. compounds found in nature are arseniferous A., AsSb, antimonial silver, AgSb, antimonial nickel, NiSb, A. oxide, Sb<sub>2</sub>O<sub>3</sub>, etc.

The metal is prepared by melting the sulphide in a reverberatory furnace so as to separate it from impurities of quartz, etc. The pure sulphide is then roasted in order to convert it into the oxide, which is afterwards reduced with carbon. Another method is the fusion of the sulphide with scrap iron, when iron sulphide and A. are formed. The A. is further purified by re-melting with potashes and on solidifying it shows fern-like markings due to crystallisation, and is known as 'star-metal.'

A. is a lustrous silver-white metal. It has a sp. gr. of about 6.7, melts at about 630° C., is hard and so brittle that it can be easily powdered. It volatilises at a white heat in air, and may be distilled in a current of hydrogen. It does not undergo alteration on exposure to the air at ordinary temps., but burns on heating to form the oxide; if burned in contact with charcoal at a high temp. the oxide is evolved in dense white fumes. The metal combines directly with chlorine with evolution of much heat.

A. forms numerous useful alloys with other metals. Eng. type-metal is an alloy of lead, A., and tin; the A. imparts hardness to the alloy and that quality of expanding at the moment of solidification which gives a clear outline to the cast. Britannia metal consists of tin, A., and zinc; pewter contains tin, A., copper, and bismuth; and anti-friction metal is usually composed of copper, A., and tin.

The chief compounds of A. are A. hydride, SbH<sub>3</sub>, a disagreeably smelling gas; A. trioxide, found in the mineral valentinite; pyroantimonic acid, formed by heating the white powder produced by the action of nitric acid on the metal; A. trichloride a crystalline solid, but if prepared by boiling the sulphide in strong hydrochloric acid, a viscous mass, called butter of A.; and A. pentachloride, a heavy, colourless, fuming liquid.

In medicine, potassium antimonyl tartrate, known as tartar emetic, is administered in small doses as a diaphoretic and expectorant, and in doses of from 1 to 2 grains as an emetic. More frequently it is injected intravenously in the treatment of kala-azar (blackwater fever) and trypanosomiasis (sleeping-sickness). A. trisulphide is given in doses from 1 to 5 grains for the same purposes. In larger doses, A. is an irritant poison, causing vomiting and purging. Chronic antimonial poisoning is characterised by nausea, progressive weakness, and may end in death by exhaustion.

**Antinomianism** (Gr. ἀντί, against, νόμος, law), the doctrine that Christians are freed from obligation to keep the law of God. Antinomian is the term applied by theologians to those who hold that faith in Jesus Christ dispenses with, and renders unnecessary, as far as a future state is concerned, the observance of morality and the performance of good works. The dispute as to whether man is 'justified' by 'faith' or by 'works' is one of the oldest in the Christian Church, and it is evident from sev. passages in the N.T. that the apostolic church was divided on the matter, but it was not until the Reformation that the term was first used. It was applied by Luther to the followers of John Agricola, his fellow townsman, who was b. at Eisleben in Saxony. At Wittenberg in 1537 Agricola maintained in a disputation the Antinomian point of view, which was controverted by Luther, Melancthon, and others. The Antinomian controversy was terminated in 1540 by a retraction by Agricola. A. found foothold in this country during the Commonwealth, but the assembly of divines in 1643 condemned sev. writings which appeared to them antinomian. Parliament in 1648 enacted that any one convicted, on the oaths of 2 witnesses, of maintaining that the moral law of the Ten Commandments is no rule for Christians, or that a believer need not repent or pray for pardon of sin, should publicly retract, or, on his refusal, be imprisoned till he found sureties that he would no more maintain these doctrines.

**Antinoüs**, a youth of extraordinary beauty of Claudiopolis in Bithynia, favourite and companion of the Emperor Hadrian. He drowned himself in the Nile A.D. 130. Hadrian paid most extravagant respect to his memory and founded Antinoöpolis in his honour. A favourite subject in art.

**Antinoüs**, see AQUILA.

**Antioch**, now **Antakieh** in Syria. Founded by Seleucus 300 B.C. after the battle of Ipsus, 301. Acquired the name of 'Queen of the East.' Here the disciples were first called Christians, A.D. 42. A. was taken by the Persians, 540, by the Saracens about 638; recovered by the E. emperor, 966; lost again, 1086; retaken by the crusaders in June 1098, and made cap. of a principality, 1099, and held by them till June 1268, when it was captured by the sultan of Egypt. It was taken from the Turks in the Syrian war, 1832, by Ibrahim Pasha, but restored at the peace. A. suffered much by earthquakes, and about 1600 persons were killed on Apr. 3, 1762. Prin. cultures: tobacco, maize, cotton, and mulberry for silk production. In 1835 it had only 5000 inhab. It has a Brit. consul. Pop. 30,000.

**Antioch College**, a non-sectarian educational institution at Yellow Springs, Ohio. It was founded by Horace Mann (q.v.) in 1853. Academic training is not regarded as sufficient of itself to equip a student for a career and therefore the college is so organised that the student may divide his time between school and practical work in the economic community. The student-roll of 1931-32 contained 586 names (371 men and 215 women). There is a library of 37,000 books.

**Antiochus**, the name of thirteen kings of Syria of the Seleucid dynasty. The lives of most of these are given below. The name was also borne by the kings of Commagene (69 B.C.-A.D. 72), whose house was affiliated to the Seleucids.

**Antiochus I. Soter**, or Preserver (280-261 B.C.), was the son of Seleucus, a general of Alexander the Great, who after the death of Alexander raised Syria into an independent kingdom. Upon the murder of Seleucus, 280 B.C., A. succeeded to the throne, and reigned 19 years. He prosecuted his father's claim to the kingdom of Macedonia against Antigonus Gonatas, son of Demetrius, who was his brother-in-law, but the dispute was accommodated by a marriage between Antigonus and Phila, daughter of Seleucus and Stratonice, in consideration of which the Macedonian prince was allowed to retain the peaceable possession of his throne. Demetrius, the son of Antigonus, also married Stratonice, the daughter of A. A. defeated the Gauls, who had crossed into Asia and settled in Galatia. He d. 261 B.C. See *Appian, Syria*; Justin, xxvii.

**Antiochus II., Theos**, or God (261-246 B.C.), son of A. Soter, succeeded his father. The Parthians, 250 B.C., under Arsaces, expelled the Macedonians from their country, and Arsaces became

the founder of the Parthian empire. Bactria and other provs. E. of the Tigris followed this example; and A., apprehensive of the final loss of those regions, concluded a treaty of peace with Ptolemæus Philadelphus, 252 B.C., by which he agreed to repudiate his wife Laodice and marry Berenice, daughter of the king of Egypt. These conditions were fulfilled; but on the death of Ptolemæus, 2 years afterwards, A. restored Laodice to her rights, and in return was poisoned by her, 247 B.C., with the view of securing the succession to her eldest son, Seleucus Callinicus.

**Antiochus III., the Great** (223-187 B.C.), was the son of Seleucus Callinicus, and succeeded his brother Seleucus Ceraunus. The young king appointed governors to preside over the sev. dists. of the Syrian empire, which, during preceding reigns, had lost much of its ter. The kingdom of Pergamus had profited by the weakness of the Seleucid dynasty, but under the able management of Achæus, the cousin-german of A., those provs. which had been wrested from the Syrians were recovered, and Attalus of Pergamus was confined within the limits of his proper kingdom.

Achæus, who had been a faithful friend of A., finding that plots were laid against his life by those who were in the king's confidence, proclaimed himself king of those provs. in Asia Minor which he had recovered, and which had been entrusted to his charge. Ptolemæus Philopator still held Cæle-Syria and Palestine, which had been conquered by his predecessor, Euergetes. A. first took arms against Egypt, and among other places he recovered Damascus. A truce was made between Ptolemæus and A., but it expired before any agreements were made, and was resumed, 218 B.C. A. penetrated into Phœnicia, and gained possession of Galilee and the tracks E. of the Jordan. But in the following year he was totally defeated at Raphia, near Gaza, and obliged to retreat to Antioch. The Syrian king, pressed by Achæus, was compelled to sue for peace with Egypt, which he obtained on condition of resigning his claim to the contested provs. A. now turned his whole attention to the destruction of Achæus, whom he overpowered and put to death; and the provs. of Asia Minor were again annexed to the Syrian empire, 213 B.C.

Arsaces, son of Arsaces I., who estab. the Parthian empire, had overrun Media while A. was engaged in the wars against Ptolemæus and Achæus. The Syrian king invaded Parthia, and after sev. campaigns Arsaces was left in possession of Hyrcania, on condition of his assisting A. to recover the rest of the revolted provs. After an unsuccessful attempt to recover Bactria from Euthydemus, with whom he concluded a treaty, he re-estab. the supremacy of Syria in the provs. between the Indus and Persia. He returned through Persia to Antioch, having been employed for 7 years in these E. campaigns, in which he earned the title of Great.

Ptolemæus Epiphanes, a child of 5 years old, succeeded to the throne of Egypt, 205 B.C., on the death of his father, Philopator. A. and Philip, king of Macedonia, united in a design to expel him and share the Egyptian dominions between themselves. A. regained possession of Palestine and Coele-Syria in 2 campaigns; and he entered Jerusalem, 198 B.C., where he was received by the Jewish people with great joy. A. then proposed a treaty of marriage between his daughter and the young king of Egypt, by which Coele-Syria and Palestine were to be given with the princess as a dowry. He now proceeded with a powerful fleet round Asia Minor, crossed the Hellespont, and took possession of the Thracian Chersonese, 196 B.C., which belonged to Philip, king of Macedonia; and here he came in contact, for the first time, with the power before which his own was compelled to retire. The Romans had already reduced Macedonia to the condition of a subject kingdom, and being jealous of this interference in European affairs, they sent ambassadors to require restitution, not only of all that A. had taken from Philip, but of all that he had taken from Ptolemæus, whose guardians, soon after his accession to the throne, had placed him under the protection of the Romans. A. replied to these requisitions in terms as haughty as those in which they were made.

In 195 B.C. Hannibal, driven from Carthage, came to Ephesus to seek the protection of the king of Syria, and his representations induced A. to match his strength against the power of Rome. In the winter of 192 B.C. A., at the invitation of the Ætolians, crossed over into Greece with an army, posted himself in the tn. of Demetrias, and was chosen by the Ætolians as their commander-in-chief. A. captured Eubœa, but he did not push on his conquests with vigour. The Rom. consul, Acilius Glabrio, defeated the Syrian king at Thermopylæ, and he was compelled to retire to Asia, 191 B.C. The next year L. Cornelius Scipio was consul, and appointed to conduct the Syrian war, and his brother, the celebrated Africanus, served under him as lieutenant. A. withdrew his forces from Europe, and the Romans crossed the Hellespont. He now offered terms of peace, but the Romans demanded more than he would concede, and he met the consul Scipio, 190 B.C., in a pitched battle near Magnesia, in which he was defeated with immense slaughter. A. retired to Syria, and yielded to the terms of the conqueror. He was to resign the provs. W. of Mt. Taurus; to pay 18,000 Euboic talents for the expenses of the war; to deliver up to the Romans his elephants and ships of war; and to place in their hands Hannibal and other foreigners who had taken refuge at his court. Hannibal, with another, preserved his safety in flight; the rest were delivered up, together with hostages for the observance of the treaty, of whom A. Epiphanes, the king's younger son, was one.

In collecting means to pay the heavy burden imposed upon him, A. plundered a wealthy temple in the prov. of Elymæis. But the people of the place rose in arms and massacred him and his attendants, 187 B.C., in the thirty-seventh year of his reign and fifty-second of his age. A. did more to restore the greatness of the Syrian kingdom as under the first Seleucus than any other of his dynasty; but he was unfortunate in meeting the first shock of that power before which all the kingdoms of the known world were destined to fall. See Polybius, v., xviii., etc.; Appian, *Syriaca*; Livy, xxxvi., xxxvii.; Sir Walter Raleigh, *Historie of the World*, 1628.

**Antiochus Epiphanes**, or **Illustrious** (175-164 B.C.), the second son of A. the Great, succeeded his elder brother, Seleucus Philopator. A. at the time of his brother's death was on his way from Rome, where he had been a hostage. Egypt now reclaimed the provinces of Palestine and Coele-Syria, wrested from her by A. the Great. In the first campaign, 171 B.C., A. routed the Egyptians between Mt. Casius and Pelusium, and fortified the frontiers of Palestine against further aggression. In the next year he overran Egypt, except the strong city of Alexandria, and gained possession of Ptolemy Philometor, the young king. In the same year in consequence of the formation by the Jews of a party favourable to the Gks. which, aided by the high priest, Jason, had succeeded in securing the supreme power in the State, he sacked Jerusalem, and profaned and plundered the temple, as related in Maccabees (i. 1. and ii. 5); after which he appointed Philip the Phrygian governor of Judæa. The Alexandrians having raised Ptolemy Euergetes, commonly called Phyxon, the brother of Philometor, to the throne, A. again invaded Egypt, 169 B.C., and laid siege to Alexandria. Being unable to reduce that city, he left Philometor as the nominal king; of the country; but the 2 brothers agreed to hold the kingdom in common, and Egypt was restored for a time to tranquillity. Thereupon, A. undertook a fourth expedition into Egypt, 168 B.C., and was laying siege to Alexandria when ambassadors from Rome ordered him to leave Egypt, and he obeyed. Returning through Palestine in the same year, he ordered that great persecution of the Jews related in the second book of Maccabees. The vigorous resistance of the Jews induced A. to send a force under Lysias into Judæa, which was totally defeated. Transported with passion he hastened towards Antioch from the N. provs., which were in a state of revolt, but he was suddenly attacked by a violent disease, and d. in agony. See Livy, xlii., etc.; Polybius, xxvi.-xxxi. ed. Bekker.

**Antiochus Eupator** (164-162 B.C.) son of A. Epiphanes, when a child 9 years old succeeded to the throne, under the guardianship of Lysias. After a nominal reign of nearly 2 years he was dethroned, and put to death by his cousin german,

Demetrius Soter, son of Seleucus Philopator, who succeeded to the crown.

**Antiochus, or Dionysus Epiphanes** (141-142 B.C.), son of Alexander Balas. Tryphon supported his claims against Demetrius Nicator, but subsequently murdered him and usurped the throne.

**Antiochus**, surnamed **Sidetes** (137-128 B.C.), was a younger son of Demetrius Soter, king of Syria. His reign was comparatively prosperous and tranquil. He reduced Jerusalem, 134 B.C. He defeated Phraates, king of Parthia, and recovered all which had been wrested from Syria, except Parthia; but he lost his life, 129 or 128 B.C., in a sudden attack which the enemy made on his winter quarters.

**Antiochus Grypus**, or Hook-nosed (125-96 B.C.). After the death of A. Sidetes, Syria was distracted by civil wars. Demetrius Nicator escaped from Parthia, and resumed the crown; but he was soon dethroned by Alexander Zebinas. Cleopatra, the wife successively of Balas, Nicator, and Sidetes, retained possession, however, of a portion of Syria, and Seleucus, her son by Nicator, regained some districts contiguous to those held by his mother, and proclaimed himself king of Syria. This raised her jealousy, and she murdered him with her own hand. She now recalled from Antioch her son A. G. (named also Philometor, and, on his medals, Epiphanes), 125 B.C. Grypus soon expelled Alexander Zebinas; but Cleopatra became jealous of him also; and she was compelled to drink a poisoned draught, which she had offered to her son. A. G. reigned in peace for 8 years; at the end of which a fresh competitor for the throne started up in the person of his half-brother.

**Antiochus**, surnamed **Cyzicenus** (112-96 B.C.), from being educated at Cyzicus, the son of Cleopatra by A. Sidetes. After a sharp contest he and his brother agreed to divide the empire in 113 or 112 B.C. Cyzicenus occupied Coele-Syria and Palestine; Grypus the rest of the empire. Grypus was assassinated, 96 B.C. Cyzicenus was defeated and slain by Seleucus, the son and successor of Grypus. Seleucus perished after a reign of 7 months.

**Antiochus Eusebes**, the Pious (95-83 B.C.), son of A. Cyzicenus, proclaimed himself king of Syria upon his father's death. While he was engaged in war with his cousin, Philip, another A., surnamed Dionysus, full brother to Philip, seized upon Coele-Syria. The latter was soon slain in a war against the Arabians. After a brief period, the Syrians, wearied by the desolating feuds of the Seleucidan princes, invited Tigranes, king of Armenia, to take possession of the country and Eusebes then fled into Cilicia.

**Antiochus**, surnamed **Asiaticus** (69-65 B.C.), was the son of A. Eusebes. Tigranes being obliged to withdraw his troops from Syria to make head against the Romans, A. gained possession of part of the kingdom, 69 B.C. He retained it for 4 years, at the end of which Syria was reduced by Cn. Pompeius to a Roman

province, 65 B.C. In A. ended the Seleucidan dynasty.

**Antipædobaptists**, name given to those who deny the validity of infant baptism. They are generally known by the shorter title of Baptists.

**Antiparallel**, a term in geometry. A. lines make with each other angles equal each to each, but contrary ways, one being external and the other internal.

**Antiparos** (ancient Olios) is an is. of the Cyclades group in the Aegean Sea, separated from Paros by a dangerous channel. It produces wine and cotton; but is chiefly celebrated for its wonderful grotto, 120 yds. long, 113 yds. wide, and 60 ft. high, from the roof of which depend large stalactites. The floor is rough and uneven, and set with various coloured crystals and stalagmites. Pop. 500.

**Antipasch**, Low Sunday, the Sunday after Easter Day.

**Antipater**, a general of Alexander the Great and regent of Macedonia during Alexander's expedition to the E. (324-323 B.C.). Suppressed Thrace and Sparta. On Alexander's death he was left in command in Macedonia, and in the Lamian war he crushed the Greeks, who had attempted to reassert their independence. He became sole regent in 321 B.C. and d. in 319 B.C.

**Antipater, Lucius Cælius** (fl. 150 B.C.), one of the most ancient of Roman historians, was also an orator and lawyer. He was a contemporary of the Gracchi, and wrote a famous list of the second Punic war. See Meltzer, *De L. Cælio Antipatro*, 1867; W. S. Teuffel, *Geschichte der römischen Literatur*, 1870.

**Antipatharia**, a sub-order of coral. The growths, usually found at great depths are slender and branched in appearance. The polypes resemble small anemones and have from 6 to 24 simple tentacles.

**Antipathy** (Gk. ἀντί, contrary, and πάθος, feeling), signifies an involuntary dislike or aversion for a certain object. Many As. are natural and do not arise from any accidental circumstance, such as the aversion to the tastes and smells of many drugs, and the dislike of certain foods. Some As. arise from fear and past unpleasant associations. Some people have As. to certain animals, because they imagine that they are very dangerous or harmful, and some faint at the sight or sound of certain things.

**Antipatris**, a city of Palestine, at edge of plain of Sharon, on main road from Jerusalem to Caesarea. Built by Herod the Great (37-34 B.C.), and named after his father Antipater. Frequently mentioned by Josephus. See also Acts xxiii. 31-32. Its ruins are the modern Ras-el-Ain, where is situated Jerusalem's water supply.

**Antipaxo**, a very small Gk. is. a little to the S. of Paxo, one of the Ionian group.

**Antiperiodics**, medicines which counteract the poisons of periodic disorders like ague. The principal A. are quinine, arsenic, and iodine.

**Antiphanes**, Athenian comic poet of

fourth century B.C. The chief representative of the Middle Attic comedy. He is supposed to have written between two and three hundred plays, the extant fragments of which were collected in *Comicorum Atticorum Fragmenta* (Koch, 1884).

**Antiphilus**, a Gk. painter of the Alexandrian age. He worked for Philip I. of Macedonia and Ptolemy I. of Egypt. He is said to have been a rival of his contemporary Apelles, and is described by Quintilian as 'excelling in light and shade and caricature' and Pliny mentions sev. of his works in various styles. He was also the inventor of a kind of caricatures called *Grylli*. They were a species of grotesque monsters, part man, part animal or bird.

**Antiphlogistics**, medicines which have the power of counteracting or allaying fever; such as mercury, aconite, antimony, etc.

**Antiphon** (480-411 B.C.), the earliest of the Attic orators, a member of the oligarchical party and was largely responsible for the establishment of the Four Hundred in 419. On the restoration of the democracy he was condemned to death. He is often regarded as the founder of political oratory. His chief work was as a professional speech-writer. Only 15 of his speeches have come down to us. They are to be found in Reiske's collection and Bekker's *Attic Orators*, 1822-23.

**Antiphon** (Gk. ἀντί, against, φωνή the voice), a species of psalmody sung alternately. Probably originated in the service of the anct. Jewish Church. Introduced into Christian worship by Ignatius (d. A.D. 115). Introduced into Lat. Church by Ambrose, Bishop of Milan, in the fourth century.

**Antiphonary**, **Antiphonarium**, in music, the book wherein the antiphones were written; a copy of which was kept in each church and monastic establishment. Such books were often very ornate and costly.

**Antipodes** (Gk. ἀντί, against, πούς, foot), a term applied to places diametrically opposed on the earth, so that if a line were drawn connecting them it would pass through the centre of the globe. Noon at one place is midnight at the other, and the longest day corresponds with the shortest. The A. of England is A. Is., near New Zealand.

**Antipope** is the name given to a pope who is not recognised by the Church, but who usurps the papal power, being chosen by some religious or political party. Authorities differ as to the number of As. Some say there have been 28, others 32, while some say 35 or 36. The first A. was Novatian, chosen in 251; and then followed Felix, chosen by Constantine in 355, during the pontificate of Liberius; Ursinus in 366, while Damasus was pope; Eulalius 418, against Boniface I.; Laurentius, 498, against Symmachus; Paschal and Theodore, 687, against Sergius I.; Theophylactus, 757, against Paul I.; Constantine, 767, and Philip, 788, against Stephen IV.; Zizimus, 824,

against Eugenius II.; Anastasius, 855, against Benedict III.; Sergius, 891, against Formosus; Christopher, 904, against Leo V.; Francon, under the name of Boniface VII., 974, against Benedict VII.; Philagathus, called John XVI., 997, against Gregory V.; Gregory, 1012, against Benedict VIII.; John, called Sylvester III., 1044, against Benedict IX.; John, called Benedict X., 1058, against Stephen IX.; Cadalos, called Honorius II., 1061, against Alexander II.; Guibert, called Clement III., 1080, against Gregory VII.; Albert, Theodoric, and Maginulf, 1101, against Paschal II.; Maurice Bourdin, called Gregory VIII., 1118, against Gelasius II.; Anacletus, 1130, and Gregory Conti, called Victor IV., 1138, against Innocent II.; Octavian, called Victor V., 1159; Guido, called Paschal III., 1164; Calixtus, 1168, and Lando Sittino, called Innocent III., 1178, against Alexander III.; Nicolas V., 1328, against John XXII.; Robert, called Clement VII., at Avignon, against Urban VI.; Pedro de Luna, called Clement VII., 1378, against Boniface IX.; Muñoz, called Clement VIII., 1424, against Martin V.; and Felix V., 1429, against Eugenius IV.

**Antipyretics**, remedies which tend to reduce the temp. in fevers. They may act (1) by the abstraction of heat, as in the use of the cold bath and ice, and by administering copious doses of diaphoretics and sudorifics; or (2) by lessening heat production by their action on the nervous system, as in the use of antipyrine, antifebrin, and quinine; or (3) by destroying the poison which causes fever; or (4) by increasing the dissipation of heat through their action on the skin or circulation, as alcohol, aconite, antimony, etc.

**Antipyrine** ( $C_{11}H_{11}ON_2$ ), or *dimethyl-phenylpyrazolone*, an organic substance used in medicine as a febrifuge.

It crystallises in white leaflets which melt at 113° C., and is soluble in water and alcohol. The aqueous solution gives a red colour with ferric chloride and bluish-green with nitrous acid.

A. has a slight effect on the temp. in health, but a marked one in fever. It has been used in almost every febrile condition, but its routine use is not now recommended. It speedily gives relief in migraine, headache, and neuralgia, and predisposes to sleep after the pain has disappeared.

**Antiquaries**, Society of, formed in the eighteenth century to promote the study of antiquities. Earlier societies had been founded in the sixteenth and seventeenth centuries, but it was not until 1717 that the society was formally reconstituted. In 1780 George III. granted the society apartments in Somerset House. It is governed by a council of 20, and a president who is also an *ex officio* trustee of the Brit. Museum. The present headquarters of the society are at Burlington House.

**Antique Crown**, a special name of an Amer. type called Egyptian by Eng. printers.

**Antiquities**, see **ARCHÆOLOGY**.



**Antirrhinum**, a genus of plants belonging to the Scrophulariaceae found in temperate climates. *A. majus* is the snapdragon, which is common in Great Britain; *A. orontium*, the lesser snapdragon, or calves' snout, is a native throughout Europe. Intermediate and dwarf varieties can be grown and of almost any colour excepting blue.

**Anti-Saloon League of America** was founded in 1893 in Ohio for the total suppression of the liquor traffic. By means of agitations, legislative measures, educational and publicity movements, it was the most important factor in the prohibition movement in U.S.A. With numerous branches throughout the states, its headquarters are at Westerville, Ohio, and Washington, D.C. This organisation was instrumental in amending the Amer. constitution and in bringing about prohibition. With the disappearance of prohibition again from the constitution, the influence of the league declined.

**Antisana**, a volcanic mt. in the Andes Mts. in Ecuador, S. America. It is about 19,260 ft. high, and was ascended by Edward Whymper in Mar. 1880. On its slope, about 12,400 ft. high, exists one of the highest inhabited places in the world.

**Antisail**, an old astronomical term (derived from the Gk. *anti*, against, and *sail*, shadow), signifying those who live on the same meridian, but on opposite sides of the equator, so that their shadows fall at noon in opposite directions. See **ANTIGOI**.

**Antiscorbutics**, remedies effective against scurvy. Under the Merchant Shipping Act, 1894, A. must be carried on Brit. ships. Lime juice is often used, hence the nickname 'limey' applied by foreigners to Eng. sailors. See **SCURVY**.

**Antisemites** was the name which was applied to those who were opposed to the Jews in the second half of the nineteenth century. The movement originated in Russia and in the Balkan peninsula and then spread into Austria, Hungary, Rumania, Germany, France, and Algeria, in which countries the Jews were to be found in large numbers. This hatred of the Jews, or Antisemitism, as it was called, was not the outcome of antipathy to their religion, but arose on account of the wealth and power which they were accumulating. In Russia and Hungary the movement assumed a terrible aspect, and riots and murder took place in 1882. In Germany and Austria Antisemitic parties arose, and a league was formed to restrict the liberties and political rights of the Jews. Thousands of Jews were compelled to flee. In 1894 the Dreyfus affair occurred in France. Capt. Dreyfus, a Jew, was falsely accused of treason and condemned, but was afterwards released.

Although Jews are now a world nation and are to be found in most countries, the intensity of Antisemitic feeling varies greatly. Russia, Hungary, Austria, and E. Europe generally, which have witnessed the most violent outbursts, were, until the late nineteenth century, the

centres where the strongest animosity was shown. In France and, before the Nazi regime, in Germany, Antisemitic actions conformed to the usages of the law, and, though exceedingly violent propaganda was common, the legal rights of Jews were upheld. In America and throughout the Brit. Empire Antisemitism is almost unknown excepting as one out of the many sentiments that sway a large number of persons. The intensity of anti-Jewish feeling is usually in inverse ratio to the ability of the people to compete with Jews in commerce and finance. In those lands where the people have little natural instinct for trade and banking, such wealth as there is flows to the Jews and the racial difficulty becomes critical; whereas in such places as the U.S.A. and Britain, where the native people develop business capacity, the Jew is accepted as a fellow-citizen. During the half century after about 1870, when France, Germany, and Italy were becoming increasingly commercial lands, the Jew found his way more generally into citizen life. In England an agrarian nation under the Edwards expelled the Jews, with whom they could not compete; but vigorous pioneers of world commerce during the seventeenth century permitted their return as having nothing to fear from them.

Antisemitic propaganda usually takes the form of rumour and exaggerated stories of secret abominable rites in illiterate countries and of book opinions or press leaders in the more educated. In France no fewer than 9 periodical papers called 'Anti-Juif' have been pub. at various times.

A terrible revival of Antisemitic feeling swept through Germany with the rise to power, in 1933, of the Nazi party under Hitler. Ger. Jews, irrespective of class or attainments, were maltreated and deprived of their livelihood, and many of world-wide celebrity sought refuge in other countries—especially England and the U.S.A. In this revival in Germany, Antisemitism took the form of a political movement owing its impulse to Hitler, who founded his 'Aryan paragraph' (see **ARYAN**) on the teaching of Gobineau, Houston Stewart Chamberlain, and others, and made it, in effect, the cardinal feature of his policy of founding a Third Reich, embracing only the pure Germanic or 'Nordic' peoples of W., Central and E. Europe. In conformity with this policy, the Jews were declared to be the enemy of the Ger. people and their persecution became a settled policy which was pursued again in 1938, when Germany annexed Austria, and in 1939 on the annexation of Czechoslovakia. In Russia the Communists would not allow Jews to continue as capitalists or 'unproductive elements,' but, for the rest, they gave them equal rights. It was in Poland and Rumania, with respectively 3,000,000 and 1,000,000 Jews, that the Jewish issue was most acute before the Second World War; and much more than in other countries, and even in Germany. Antisemitism was a popular

movement. This movement implied all manner of motives and mental attitudes: the jealousy felt by the Polish lower middle classes for their Jewish rivals and competitors; the Socialism of the ignorant, in which the Jews were blamed as a sinister capitalist power; the deeply ingrained clerical hatred of the Jew as 'Christ's enemy'; and, finally, the fear of all govts. of the spread of Communism among the great mass of impoverished Jewish artisans and outright paupers. The gentle working classes and the peasantry in those countries, however, remained, on the whole, unaffected by Antisemitic propaganda; but they also remained aloof from the Jews, and more or less indifferent to their fate. This indifference was accentuated by the separatism of the Jews, which was encouraged by the gentle ruling classes as well as by Jewish clerical obscurantism and Zionist nationalism. Their separate language, their anachronistic religious way of life, and their medieval mode of dress all helped to create virtual ghettos in Poland long before the Nazis built walls around them. The guilt of separatism was at least, in part, responsible for the passivity and apparent indifference with which the mass of Gentiles watched the wholesale slaughter of the Jews in the terrible concentration camps of Belsen, Buchenwald, Auschwitz, Dachau, and Maidanek. It is impossible to determine precisely how many Jews were slaughtered in these camps, but even the most conservative estimates put the total at not less than 4,000,000.

See A. Dushaw, *Anti-Semitism: the Voice of Folly and Fanaticism* (New York), 1943; A. Tartakower and K. R. Grossmann, *The Jewish Refugee* (New York), 1944; Max Gottschalk and Abraham G. Duker, *Jews in the Post-war World* (New York), 1945; James Parkes, *Antisemitism: an Enemy of the People*, 1945, and *The Emergence of the Jewish Problem*, 1946. See also AUSCHWITZ, BELSEN, 'MEIN KAMPF', etc.

**Antiseptics**, agents which prevent putrefaction by destroying or arresting the growth or development of the germs upon which putrefaction depends. The process must be distinguished from disinfection, which destroys the germs causing disease, though the 2 terms are often confused. The theory that putrefaction and fermentation are due to the presence of minute organisms owes much to the researches of Pasteur, and Lord Lister was the originator of the method of treating surgical wounds by substances known to destroy or arrest the growth of these organisms.

The bacteria of putrefaction are always present in ordinary air, but they require certain conditions of temp. and moisture to develop. Thus it is found that extreme heat or cold kills bacteria and prevents infection. If therefore substances like milk or meat are boiled and then kept in hermetically sealed vessels they may be kept fit for consumption for an indefinite period. On the other hand, putrescible substances kept at a low

temp. in refrigerators will remain unaffected, and advantage is taken of this fact in the transportation of meat from America, Australia, and New Zealand to this country. Absence of moisture is unfavourable to the growth of bacteria, so that the practice of drying fish, fruit, and meat is a method of preserving them. It should be observed, however, that food materials preserved in such a manner should be kept in a perfectly dry place, as they are liable to absorb moisture from the air, when putrefaction becomes possible. Jam owes its keeping qualities to the high sugar content, in which the osmotic pressure is too great to allow the activity of bacteria, though here also the entry of atmospheric water vapour should be guarded against.

Besides these methods of preventing infection, there are certain chemical substances which have the power of destroying the germs of putrefaction. Their uses include the preservation of food and the prevention of septic poisoning in wounds. It is necessary, of course, that an A. employed for preserving food should not be injurious or unpalatable to man, and that A. used for dressing wounds should not have an undue irritating effect upon the tissues. Salicylic acid is used for the preservation of food, but the use of boracic acid for this purpose is now illegal. It was, until recent years, much used to preserve milk, butter, meat, and fish. Salicylic acid is used to preserve beer, butter, fruit, and meat, but its employment is not completely innocuous, and therefore should be discouraged. The same criticism applies also to formalin, sometimes used for the preservation of cream.

Carbolic acid was for some time the chief A. used in surgery, but its place has to a great extent been taken by mercuric chloride (corrosive sublimate) and mercury binoiodide. Thymol, salicylic acid, phenyl salicylate, and boracic acid are also used as A., as well as alcohol, hydrogen peroxide, iodine, and proprietary derivatives of coal tar (e.g. dettol). For the dressing of wounds not made by the surgeon iodoform is often employed. It does not kill the bacteria directly, the action on the micro-organisms being subsequent to a decomposition resulting, under the influence of the heat of the body, from fermentation induced by matter exuded from the wound.

The influence of A. on the results of surgical practice has been enormous. Pyæmia, septicæmia, and gangrene are now much more uncommon than formerly, and it has been found possible to treat wounds without resorting to amputations where that course would be impossible without A. Compound fractures and extensive wounds of the limbs do not, therefore, commonly mean the loss of the limb affected. Operations, too, are performed which were formerly considered too dangerous, particularly in connection with abscesses and diseases of bones and joints. Owing to the damage caused by A. to the tissues, and consequent delay in healing, the A. method of

nursing has now largely given way to the aseptic technique, which aims at preventing, by strict cleanliness, the entry of germs into wounds.

**Anti-slavery.** A movement for the abolition of the slave trade was started in England by Thomas Clarkson about 1782, subsequently to Lord Mansfield's decision in the Somerset case that slaves could not exist in England. He was assisted by William Wilberforce, and in 1792 a motion in favour of gradual abolition passed the Commons. In 1805 the trade was forbidden with new colonies, and in 1807 the General Abolition Bill extended the prohibition to all Brit. possessions. The Emancipation Act of 1883 provided for the gradual abolition of slavery in the colonies.

In the U.S.A. emancipation was practically accomplished in the N. states by 1799, and there was a gradual growth everywhere of public feeling in favour of total abolition. A.-S. societies were founded in 1832 and 1833, and most Amer. writers, including Emerson, Bryant, Whittier, Lowell, Longfellow, and Mrs. Stowe, lent their influence in the same direction. The famous emancipatory edicts of Lincoln in 1862, 1863, and 1865 secured the success of the abolitionists. See further under SLAVERY AND THE SLAVE TRADE.

**Antispasmodics**, medicines intended to relieve spasms. The term is applied to (1) drugs which paralyse the motor centres or nerves, as anaesthetics, or which depress them, as bromides of potassium and ammonium; (2) drugs which produce a general depression of the vital functions, as tobacco, aconite, and sedatives generally; (3) drugs which relieve colic by stimulating the bowels, as asafoetida and castor; and (4) drugs which relieve spasm of the bronchial tubes, as stramonium and belladonna.

**Antispast**, a tetrasyllabic metrical foot, composed of an iambus and a trochee; the first and last syllables being short and the middle ones long, as in 'Clîstêm-nêstrâ'.

**Antisthenes** (444-365 B.C.), founder of the Cynic school of philosophy, b. at Athens. Studied rhetoric under Gorgias. Became a devoted pupil of Socrates, and walked daily from Piræus to Athens to hear him discourse. Founded a school of his own, where he attracted the poorer classes by the simplicity of his life and teaching. This was in the Cynosarges, a gymnasium for the use of Athenians born of foreign mothers; whence probably his followers acquired their name, Cynics. From this school subsequently sprang the Stoics.

**Antistrophe** (Gk. *ἀντί, against*, *στροφή, a turning*), part of an ode sung by the chorus on returning from left to right, having previously sung the strophe when moving from right to left. It is of Gk. origin.

**Anti-Taurus**, see TAURUS.

**Antithesis** (Gk. *ἀντί, against*, *θέσις, placing*), an opposition or contrast of ideas expressed by using words that are naturally opposed to one another.

**Antitoxin**, a term applied to substances elaborated by the body to counteract the toxins of bacteria. Their chemical composition is a matter of doubt, but they are known to be proteins. It is found that when the body is inoculated with small quantities of a toxin, increasing quantities of A. are generated to counteract the poison, so that the individual eventually acquires 'active' immunity; by chemical treatment the toxins can sometimes be converted into less harmful 'toxoids'; these are used for immunisation against diphtheria and tetanus. The serum treatment consists in inoculating an animal, such as a horse, with small quantities of toxin until it becomes immune, when the blood is withdrawn and freed from blood corpuscles; this constitutes the serum (containing A.), which may be regulated to any degree of potency and injected into the human blood system, providing 'passive' immunity. Active immunity protects an individual from a disease, whilst passive immunity is useful as a means of treatment, i.e. when the disease has already been acquired; both methods are employed in diphtheria and tetanus.

**Anti-trades.** Steady winds blowing in the upper air in a contrary direction to the trade winds blowing at the earth's surface. Thus in the N. hemisphere they blow from the S.W. and in the S. hemisphere from the N.W. Their direction has been demonstrated by the dispersion of matter ejected from volcanoes.

**Anti-Trinitarians**, see ARIUS, UNITARIANISM.

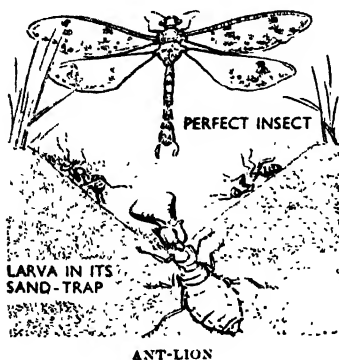
**Antitype** (Gk. *ἀντίτυπος*, of corresponding form) is the representation of that which was prophesied. Thus, in Scripture, the paschal lamb is the type, of which Christ is the A.

**Antium**, now Porto d'Anzio, was a very ant. tn. of Latium. It was founded by Tyrrhenians and Pelasgians, and was an important city of the Volsci. The people were given to piracy. It was taken by the Romans 468 B.C., revolted, and again taken by the Romans 338 B.C., who colonised it and took all its ships, the beaks of which (*rostra*) served to ornament the platform in the Rom. forum. It was the residence of many of the Rom. nobles and emperors in the latter times of the republic and under the empire. Nero, who was born there, built many fine buildings. See ANZIO, PORTO D'.

**Antivari**, a seaport on the Adriatic Sea, formerly belonging to Albania, but ceded to Montenegro by the treaty of Berlin, 1878. It is the seat of a Catholic archbishop, and contains a castle built by the Venetians, from whom it was taken in 1573. Pop. 2500.

**Anti-vivisection.** Agitation against vivisection, based on the contention that the practice is unnecessary and cruel, followed the publication of the experiments of various nineteenth-century continental investigators, particularly Majendie. It resulted in the appointment of a royal commission in England in 1876, and the practice was regulated by the Vivisection Act of that year.

Another commission sat from 1906 to 1908, and the report was pub. in 1912. Among the numerous societies founded for the total suppression of the practice are the London and Provincial A.-V. Society, which is the oldest, having been founded in 1876, and has a monthly official organ, the *Anti-Vivisection Journal*; the Brit. Union for the Abolition of Vivisection, with the largest membership in the world, under direct voluntary medical leadership, and which issues a monthly paper, the *Abolitionist*; the Animal Defence and A.-V. Society, the National A.-V. Society, and the Electoral and



Parl. A.-V. League which has been particularly active during election campaigns. A few hospitals denounce the practice, while many medical men, scientists, and clergymen of all denominations are members of the various societies and responsible for some of the propagandist literature issued by the societies. It is to be noted that at the public health exhibitions of films at Westminster, illustrating experiments in vivisection, and shown at lectures in medical schools, hospitals, and colleges, a certificate is required by statute to be given by specified scientific authorities to the effect that the 'knowledge so imparted is useful in saving human life and in alleviating human suffering.'

**Antlers**, the outgrowths of the frontal bone found in male deer. The A. is attached by a bony ring, the 'burr,' to a pedicle, which in turn is joined to the skull. During growth the antler is covered by a sensitive, hairy skin, known as 'velvet,' which dries up and is rubbed off when maturity is attained. The A. are shed annually, and the number and complexity of the branches increase year by year. They occur in various forms, in practically all kinds of deer, and are used for offensive purposes. The female reindeer is antlered as well as the male. A. with more than 12 points are seldom found in Great Britain, but heads of 60 points are in existence on the Continent. Shed A. are used commercially for handles of knives, umbrellas, etc.

**Antlia Pneumatica**, the 'Air-Pump,' a constellation in the S. hemisphere, named by Caccalle in 1752. It is bounded by Centaurus, Crater, Hydra, Pictis Nautica, and Argo. Sigma Antliae is a variable star with a period of 7 hrs. 47 min.

**Ant-lion**, the larva of the family Myrmeleonidae, of the order Neuroptera. The eggs are laid in loose sand, and when the larva has appeared it forms a conical pit, at the bottom of which it hides, and seizes upon any small insect, such as an ant, which may fall into it. By means of its legs it throws sand on its victim to hasten its fall, and by means of its mandibles, which communicate with the alimentary canal, it holds it firmly and absorbs its juices, then throws away the body. The mature insect has 4 wings. It is unknown in England, but is found in various parts of Europe and America.

**Antæci**, from the Gk., signifies 'those who live over against each other,' and is the name given to the inhab. of 2 places which have the same lat. and long., except that one place is N. of the equator and the other S. Those who live N. of the equator are A. to those who live S., and vice versa. Two antæcial places have the same hour of day or night, but opposite seasons of the year.

**Antofagasta**: 1. a tn. and port of N. Chile, cap. of Chilean prov. of the same name. Founded in 1870 as a shipping port for the silver mines in that dist. Belonged to Bolivia until 1879. Then occupied by Chilean military forces. The smelting works for silver mines are located here. Pop. 54,000. 2. A prov. between Tarapacá and Atacama. Rich in saline deposits. The silver mines of Caracoles are about 90 m. N.E. of the port of A. It produces for export silver, copper, lead, and salt. Chief tns. are Taltal, Cobija (the old cap.), and Tocopilla. The prov. belonged to Bolivia until 1879, and fell into Chilean possession in the war of 1879-82. It was ceded definitely to that republic in 1885. Area 46,621 sq. m. Pop. 145,000.

**Antoine de Bourbon**, duke of Vendôme, married, in 1548, Jeanne d'Albret, only child of Henry II., king of Navarre. Henry, prince of Béarn, afterwards Henry IV. of France, was the offspring of this marriage. A. assumed the title of king of Navarre in the right of his wife. A. de B. aspired to be at the head of the administration of France after the accession of the youthful King Francis II., but failed. When the civil and religious war broke out in 1562, the king of Navarre commanded the king's troops and received a wound at the siege of Rouen, of which he d. in November of the same year. See **BOURBON**; **HENRY IV.**

**Antokolsky, Marc** (1842-1902), Russian sculptor, b. at Vilna. In 1864 he was admitted as a special student to the Academy of Fine Arts, St. Petersburg, where he gained numerous medals. In 1871 the Emperor Alexander II. bought his statue of 'Ivan the Terrible.' A. finally settled in Paris. Among his best works are 'Peter the Great' (1872); 'Christ Bound before the People' (1874);

'The Death of Socrates' (1876); 'The Last Sign' (1878); 'Mephistopheles' (1881); 'Spinoza' (1882); 'Yermak' (1900); 'The Sleeping Beauty' (1900).

**Antommarchi, Francesco** (c. 1780-1838), Napoleon's physician at St. Helena, was a native of Corsica, and a surgeon and anatomist of considerable repute. He enjoyed the full confidence of the emperor, who left him a considerable sum of money. After serving as director of hospitals in the Polish revolution, he proceeded to the W. Indies, and d. in Cuba. He wrote *Les Derniers Moments de Napoléon* (1823).

**Anton, Robert** (fl. 1616), poetical writer. Author of a vol. of satires, *Philosophers' Satyrs*, the second ed. of which was named *Vices Anatomie Scourged and Corrected in New Satires*. Its chief interest lies in numerous references to Beaumont, Spenser, Jonson, Chapman, and Daniel.

**Antonelli, Giacomo** (1808-76), was the son of a wood-cutter of the lt. vil. of Souino. After a brilliant career in the Grand Seminary at Rome, Pope Gregory XVI. preferred him to various eccles. appointments. Pope Pius IX. made him a cardinal in 1847, and in 1848 president of the Liberal Cabinet which drew up the *Statuto* or Constitution. On the fall of the ministry he fled with the pope to Gaeta, but on their return (1850) again became the pope's chief minister. He amassed a large fortune.

**Antonello da Messina** (c. 1414-c. 1493), lt. painter, a native of Sicily, was a close follower of Flemish methods of painting, which he learnt from the Van Eycks and introduced into Italy. He acquired great renown in Venice as a portrait painter. His chief extant works are 'Salvator Mundi' and 'The Crucifixion', both in the National Gallery, London, the portrait of an unknown man (Berlin Museum), and portraits at Dresden, Rome, Venice, and in the Louvre.

**Antonia Major** was the elder daughter of M. Antonius and Octavia, according to Suetonius and Plutarch, but Tacitus (*Ann.* iv. 44; xii. 64) speaks of her as the younger daughter. She married L. Domitius Ahenobarbus, Heron, Cn. Domitius, married Agrippina, and was the father of the Emperor Nero; and her daughter, Domitia Lepida, was the mother of Messalina, afterwards married to the Emperor Claudius.

**Antonia Minor** (38 or 37 B.C.-A.D. 38) was the sister of A. Major, and the wife of Drusus Nero, the brother of the Emperor Tiberius. She had 3 children, Germanicus, Livia, and the Emperor Claudius; Germanicus had a son, Caligula, who reigned. She was noted for her beauty and her chastity.

**Antonina**, seaport of São Paulo, Brazil, on bay of Paranaguá. 13 m. N.W. of Paranaguá. Pop. 10,000.

**Antonine Column**, a lofty pillar which stands in the piazza Colonna at Rome. It was raised by the senate in commemoration of the victories of Marcus Aurelius Antoninus over the Marcomanni

and other Ger. tribes. The total height is 163½ ft., but the pedestal is disproportionate to the shaft. The capital is Doric, and the shaft is made of 28 blocks of white marble. A spiral staircase of 190 steps is cut through the interior of the marble, and leads to the gallery on the top, which is surrounded by a balustrade. The exterior of the shaft is covered with *bassi-relievi*, representing the victories of Marcus Aurelius.



W. F. Mansell

ANTONELLO DA MESSINA  
Self-portrait in the National Gallery, London.

**Antonini Itinerarium**, a register of the prin. roads and routes of the Rom. empire, probably the records of the survey of Julius Caesar. The book is divided into 2 parts, one of which deals with the road routes of Europe, Asia, and Africa, the other with the prin. sea routes. The distances are all given from Rome. The author is not known definitely, but if it was a Rom. emperor it was probably Antoninus Caracalla.

**Antoninus Liberalis** probably lived under the Antonines. He is the author of a work in Gk., entitled a *Collection of Metamorphoses*. This collection is borrowed from a variety of authors, and is valuable as containing many passages of poets who are now lost. The best ed is that of H. Verheyk, Leyden, 1774.

**Antoninus Pius** (A.D. 86-161), son of a Rom. of consular rank. Adopted by the Emperor Hadrian in 138, he succeeded him in the same year. His elevation to the imperial purple was very popular, and he almost immediately adopted a policy of reform and retrenchment. He was a patron of science, a protector of the Christians, and a sincere worker for the good of his people. He

was responsible for the building of the wall of A. from the Clyde to the Forth.

**Antoninus, The Wall of.** This was an earthen rampart and ditch, built to strengthen the line of fortifications already laid down by Agricola. The mound (*vallum*) ran from Bridgess on the Forth to W. Kilpatrick on the Clyde, a distance of about 37 Eng. m. The width of the mound and ditch seems to have been about 25 yds.; its depth from the top of the mound to the bottom of the ditch has been variously estimated at between 40 ft. and 20 ft. It had in it at least 19 well-appointed stations, with small watch-towers in between. A military road ran at the back of the *vallum*. The object of the wall was to keep back the inroads of the barbarians, but the Rom. power was not so strong between the S. and N. walls as it was in the ter. to the S. The great disadvantage of such a wall seems to have been that it required almost one-fifth of the whole of the garrison of Rom. Britain to guard it.

**Antonio de Lebrija (1444-1522),** Sp. writer, b. in Lebrija, Andalusia. For 20 years he taught belles-letters at the univ. of Salamanca and then at Alcalá, to which latter place Cardinal Ximenes had appointed him. He is especially remembered as one of the most valued collaborators on the Complutensian polyglot Bible, an enterprise under the auspices of the above-named cardinal. He wrote numerous works on languages, mathematics, theology, etc. When he d. he was engaged on a hist. of Spain which has never been completed.

**Antonio, Nicolás or Nicolao (1617-84),** a Sp. writer, b. at Seville. His most important work is *Bibliotheca Hispana*, an account of Sp. writers from 1500 to 1664 (Rome, 1672, 2 vols. folio, and Madrid, 1783, 2 vols. folio). For Sp. literature there is certainly neither a better nor a safer guide.

**Antonio of Padua (1195-1231),** a devoted follower of St. Francis of Assisi, was b. at Lisbon. In 1220 he entered the order of the Franciscans. He desired to devote himself to missionary labours, but being wrecked on the coast of Sicily he wandered through Italy, gaining a great reputation as a preacher. To him are attributed many miracles and works of wonder. He d. in 1231, and in the following year was canonised by Gregory IX. Festival, June 13.

**Antonio, Prior of Carto (1531-95),** was the natural son of Louis, younger son of Emmanuel, king of Portugal. On his return from captivity in Morocco he claimed the throne of Portugal on the death of Cardinal Henry. He was opposed by Philip II. of Spain, who had a much better claim, as had also the Duchess of Braganza. Being supported only by the peasantry, he was easily defeated, and fled to France and later to England, by both of which countries he was supported out of hostility to Spain. Expeditions fitted out by Fr. and Eng. alike failed, and he d. a disappointed claimant.

**Antonius, Gaius (d. 44 B.C.),** surnamed

**Hybrida**, son of the Orator, was the colleague of Cicero in his consulship (63 B.C.). Under the orders of the Senate he had to conduct the war against Catiline, but on the day of the battle he was prevented by illness, real or feigned, from appearing on the field, and the command devolved upon his lieutenant, Petreius. In 61 B.C. he had, as proconsul, the prov. of Macedonia. A. gave out that Cicero had stipulated for the payment of a large sum of money, in return for Cicero's aid in getting him the prov., a charge which Cicero's ambiguous language and conduct seem not to discountenance. A. was guilty of great extortion, and at the end of the first year Pompeius threatened a motion in the senate for his recall. Cicero, who avows in his private letters that he could not defend A. without injury to his own character, nevertheless exerted his eloquence most powerfully and successfully in his defence. Accordingly A. held the prov. for a second year; but on his return (59 B.C.) he was brought to trial on a charge of extortion and of carrying on war out of his prov. without the authority of the state. Though again defended by Cicero, he was found guilty, and condemned to perpetual exile. He returned to Rome 47 B.C., and probably d. 44 B.C.

**Antonius, Marcus, the Orator (142-87 B.C.),** the son of C. A. In 99 B.C. he was the colleague of A. Postumius Albinus in the consulship; and in the following year he defended M. Aquilius on a charge of extortion during the Servile war in Sicily. In 97 he was censor. He fell a victim to the fury of Marius and Cinna, when they took forcible possession of Rome (Plutarch, *Marius*, xlv.). His eloquence is celebrated by Cicero in his *Brutus*, xxxvii., xxxviii.

**Antonius, Marcus (d. 69 B.C.),** eldest son of the Orator, and father of the triumvir. He was entrusted with the duty of protecting all the coasts of the Mediterranean against the pirates. Crete was the chief scene of his operations, and though his partial successes gained him the honorary title of Creticus, the outrages and extortion of which he was guilty led at last to an insurrection in which he lost his life.

**Antonius, Marcus (Mark Antony) (83-30 B.C.),** the Triumvir, grandson of A. the Orator, and son of A. Creticus, was b. of a patrician family, and was related to Julius Caesar on his mother's side. His youth was spent in profligacy. In 58 B.C. he fled to Greece in order to escape his creditors, and in Athens he spent some time in listening to the teachings of the Gk. philosophers. Summoned to the campaign against Aristobulus in Palestine, and taking part later in a campaign in Egypt, he distinguished himself by his bravery and activity. In 54 he was with Caesar in Gaul, and through his influence he became quaestor, augur, and tribune of the plebs. When the civil war broke out he was one of the warmest supporters of Caesar, and was expelled the senate house. He was deputy governor of Italy during Caesar's absence in

Spain, and later also during his absence in Africa, whilst he was second in command at the famous battle of Pharsalia. During his period of office A. seems to have conducted himself with little tact or morality. He divorced his wife, being enamoured of the actress Cytheris, and drank to excess. He quarrelled with Cæsar when he returned, but a speedy reconciliation followed. In 44 B.C. he was consul with Cæsar and supported the offer of the crown to Cæsar. After the assassination of Cæsar he so played on the passions of the Rom. mob by publishing Cæsar's will and by his eloquent oration, that the conspirators were forced to flee from Rome, and A. was left to attempt to carry out his ambition of becoming dictator himself. In Oct. 44 he set out to attack D. Junius Brutus, who had refused to surrender the prov. of Cisalpine Gaul, which he had received from the senate, to him.

By this time, however, Octavian, Cæsar's heir, had returned, and to him flocked the soldiers of the dead Cæsar. A. was declared a public enemy and Octavian commanded the operations against him. He was defeated at Mutina. Octavian now forced the senate to give him the consulship, but meanwhile A. had escaped and had joined Lepidus. He marched towards Rome with large forces, but terms were arranged between himself, Octavian, and Lepidus wherein it was agreed that they should declare themselves triumvirs and share the whole Rom. world. Gaul was to go to A., Spain to Lepidus, and Africa, Sardinia, and Sicily to Octavian. A huge proscription followed, in which Cicero perished a victim of the revenge of A. In 42, by the 2 battles of Philippi, the republican parties were annihilated. In the following year A. was captivated by the charms of Cleopatra and remained in her company during the winter at Alexandria. A short outbreak of war between his wife Fulvia and Octavian recalled him, but on the death of Fulvia a reconciliation of the triumvirs took place, and he married his colleague's sister, Octavia. A fresh div. of the empire was made, Lepidus getting Africa, Octavian the W., and A. the E. In 39 he visited Athens; in 37 he renewed the agreement with Octavian, and then returned to Syria, where he was still under the spell of Cleopatra. In 32 he was deprived of his power, and war was declared against Cleopatra. In 31 he suffered defeat at Actium and fled to Egypt, where, deserted by his troops and pursued by the enemy, he committed suicide.

**Antonius Musa**, *see* MUSA.

**Antonomasia**, in rhetoric, the substitute of a descriptive epithet for a proper name, or *vice versa*, as when Shakespeare is called 'the swan of Avon,' or an orator 'a Cicero.'

**Antony, Saint** (A.D. 251-356), called the Great, was b. at Koma in Upper Egypt, and was the first institutor of monastic life. He distributed his property amongst his neighbours and the poor, and retired to a wilderness near his native vil. He

afterwards went further into the desert, where he lived in solitude until 305, when he founded his first monastery in the Fayum, near Aphroditopolis. Seven of his letters, written originally in Coptic, but trans. into Lat., are extant in the *Bibliotheca Patrum*. In 1089, cures of the distemper called the 'sacred fire' were believed to have been wrought by his intercession. From that time it was called St. A.'s fire, and in modern days erysipelas.

**Antony of Padua**, *see* ANTONIO OF PADUA.

**Antrim**, maritime co. of N. Ireland. The formation in the N. and E. is hilly, the interior sloping in the direction of Lough Neagh. The prin. elevations are Trostan, 1810 ft., and Slemish, 1782 ft. The prin. streams are the Bann, the Main, and the Bush. The coastline is distinguished by its basaltic rock formation, the Giant's Causeway being one of the finest specimens of columnar basaltic rock. Peat bogs are frequent in the interior. Salt, iron, and limestone are extensively worked, and there are coal-fields near Ballycastle. A. is the centre of the Irish linen manuf. The other staple industries are agriculture (hax, oats, and cereals), and the manuf. of cotton and wool. It has important coast fisheries. The co. returns 7 members to the Parliament of N. Ireland and 2 to that of Great Britain and Ireland. The predominant form of religion is Presbyterianism, an effect of the Scottish colonisation. Catholics are also numerous. Pop. (1937) exclusive of co. bor. of Belfast, 197,000. Pop. of tn. 5000. Area 1090 sq. m., of which about one-third is under cultivation. The co. tn. of A., 14 m. N.W. of Belfast, has linen and paper industries.

**Antrim, Randal Macdonnell**, first Marquess of, and Earl of Dunluce (1609-83), Catholic nobleman. Introduced to court, 1634; created a marquess, 1643, on account of his promise to raise an army of 10,000 in Ireland for the service of Charles I. In this he was unsuccessful, but in 1644 sent 1600 men to the aid of Montrose in Scotland.

**Antrum of Highmore**, in anatomy, a term applied to the maxillary sinuses; a cavity in the body of the upper jaw-bone, forming an accessory air cavity to the cavities of the nose (*q.v.*). The roof forms the floor of the orbital cavity.

**Antseranana**, or **Antsirano**, seaport on N. coast of Madagascar, on Diego-Suarez Bay. Founded in 1855. The chief Fr. naval centre in the Indian Ocean and of great military importance. Pop. 18,000.

**Antung**, one of the chief ports of Manchuria, near the mouth of the Yalu R. It is a junction of the railway from Mukden and the Korean railway. Pop. 165,000.

**Antunnacum**, *see* ANDERNACH.

**Antwerp**: 1. prov. of Belgium, 1104 sq. m., pop. 1,267,000 at the end of 1946. 2. cap. of this prov. on the Scheldt R., 55 m. from the sea and 27 m. N. of Brussels. Chief seaport and commercial centre of Belgium. Excluding the suburbs, the area is 33.4 sq. m. and the pop.

260,000; including the suburbs (Berchem, Borgerhout, Durne, Ekeren, Hoboken, Merksem, Mortsel, and Wilryk) the area is 64.4 sq. m. and the pop. 550,000. The completion of the new docks has brought up the total quayside length to about 150,000 ft., making A. one of the largest ports in the world. In 1938 about 12,000 vessels of a combined tonnage of 24 million (quarter Brit.) entered the port. In 1946 the number of vessels was 5300 and the tonnage 11½ million; in the first half of 1947, 3600 vessels with a tonnage of 8.8 million. The chief of its many manufs. are sugar, beer, spirits, soap, candles, tobacco, cigars, chocolate, biscuits, sewing-silk, chemicals, furniture, and textiles. It is also extensively engaged in the industries of shipbuilding, diamond-cutting, petroleum-refining, tanning, etc. Surrounded by two circles of fortifications, A. was considered before the First World War to be one of the most strongly fortified places in Europe. The city is exceptionally rich in treasures of architecture and painting. Amongst the most notable of these are the superb Gothic cathedral (1352-1543) with its 6 aisles, its famous chimes, and Rubens's masterpieces 'The Descent from the Cross' and 'The Elevation of the Cross'; the church of St. James (1491-1624) containing the tomb of Rubens and a beautiful altar-piece by the master; the Museum Plantin-Moretus, residence and workshop of this famous printer's family since 1520; Rubens House (reconstructed recently); the old castle Steen (tenth century) and the Butchers' Hall (sixteenth century), now historical museums; the hôtel de ville (1565) and the Exchange. The Royal Gallery of Fine Arts contains a fine collection of masterpieces of all ages and schools, comprising numerous pictures by Van Eyck, Memlinc, Maessys, Rubens, Van Dyck, Jordaens, and many other Flemish painters. A. has had a varied and eventful hist. It appears to have been founded by a Frankish tribe some time before the eighth century. In the beginning of the ninth century A. was destroyed by the Northmen. The foundations of the Steen castle date from the period A. was rebuilt in the tenth century. From the eleventh century its importance increased steadily, but its commercial traffic was confined to local needs until the fifteenth century, when, with the decline of Bruges, began the modern prosperity of A. In the sixteenth century it was the most prosperous city of N. Europe. It lost this position in 1576 when 8000 of its inhab. are said to have been butchered during the Sp. invasion. The city was captured in 1585 by Alexandro Farnese, duke of Parma. In 1648 the Scheldt was closed by the treaty of Westphalia. The city fell into the hands of the Fr. in 1794. Napoleon visited it in 1803 and took a great interest in its potentialities. He wished to make it a strong commercial and military centre, with special reference to its possible use against England. He ordered the construction of the 2 first docks and of new shipbuilding yards.

From 1815 to 1830 as part of the kingdom of the Netherlands, A. received a new impetus from the trade with the Dutch colonies. During the 1830 revolution A. was stoutly defended by the Dutch general Chassé, but surrendered to the Fr. in 1832, and was finally ceded to the Belgians, whose possession was confirmed by the treaty of 1839. In 1863 Belgium paid 36 million francs to obtain from the Netherlands the freedom of traffic on the Scheldt. From that time it steadily advanced in prosperity to its flourishing condition prior to the Second World War.

*Siege of Antwerp (1914).*—The siege and defence of A. in the First World War occupied the period Sept. 28–Oct. 9. While Liège was still holding out, King Albert on Aug. 12 decided to retire on A., so as to be in a position to attack the flank of the enemy advancing through the S. of Belgium into the N. of Fr. Two sorties from A. were made on Aug. 25–26 and Sept. 9–13, delaying successfully the Ger. reinforcements for the battle on the Marne. On Sept. 28 the Gers. launched their attack against the A. stronghold by a direct advance on the Scheldt from the S. and S.E., the quarter in which the outer defence works of A. extended 9 m. along the crescent formed by the riv. and its tribs. In a few days, one by one, the main forts were put out of action. The fort of Walem fell after being heavily shelled on Oct. 2. The garrison took up a new position behind the Nethe R. Next day (Oct. 3) a Brit. marine brigade 2200 strong and 2 Brit. naval brigades with 6 heavy guns arrived, and the hopes of the garrison ran high. Whether the Brit. force was sent in the hope of relieving the tn. or merely as an isolated incident, or to co-operate in saving the situation in S. Flanders by holding the enemy on the Scheldt, is doubtful, but relief was probably the true if vain purpose. Repeated enemy attempts to cross the riv. were repulsed between Oct. 3 and 5 with heavy loss, but on Oct. 6 the Belgian line was pierced. The whole Belgian force and the Brit. marines then fell back within the inner forts to make a final stand. The successful withdrawal of the army began in the same night, the great oil-tanks of the port having previously been destroyed to prevent capture. About 200,000 inhab. crossed the Dutch frontier. Three battalions of the 1st Brit. Naval Brigade were also compelled, though not having received the order to retire, to enter Holland and so were interned. The tn. was formally surrendered on Oct. 10. The ensuing retreat was a repetition on a minor scale of the epic retreat from Mons. As a result of the fall of A. Ostend and Zeebrugge were evacuated and the Belgians took up fresh positions on the Yser. *Consult* Field-Marshal Earl Ypres, 1914; *The British Official History of the War*. A. in the Second World War.—On May 17, 1940, the last of the Belgian troops left the city, making the Scheldt tunnels useless for the enemy, who entered A. on the following day. The Gers. remained in occupation until 1944, when it was liberated by the Brit. advance. The



11th Brit. Armoured Div. entered the city after a daring drive northwards of 110 m. in 8 days. Helped by the underground army's action in saving a bridge over the Ruppel at Boom (10 m. S. of A.), the first tanks arrived at A. unexpectedly on Sept. 4. There was no Ger. resistance in the city of any account, nor were the port installations blown up. The undamaged, well-equipped port was a valuable weapon in the hands of the Allies. The Gers. offered some resistance just N. of A. on the Albert Canal until Oct. 4. From Oct. 13 until the end of March 1945 the city was subjected to incessant flying-bomb and rocket attacks, causing much loss of life and damage; but this did not interfere with the working of the port and the moving of military supplies, which began to reach A. on Nov. 28 after the complete liberation of Walcheren at the mouth of the Scheldt.

The Albert Canal, linking Liège with A., was completed in 1939. It figured prominently in the fighting for the relief of the Low Countries in 1944.

**Anu**, chief of the Babylonian gods, head of the great divine triad, the other two being Enlil and Ea: the father of the gods and the ruler of destiny. The name is found on the earliest known inscriptions in Babylonian remains. His priu. temple was at Uruk. Later he gave place to the Assyrian god, Ashur.

**Anubis**, in Egyptian mythology the son of Osiris and Isis, a subordinate deity of the third order, represented as having the head of a dog or jackal. On Rom. monuments he is identified with Hermes, and he was worshipped by the Roms. as Mercury.

**Anupshahr**, tn., United Provs., India, on the Ganges, 73 m. S.E. of Delhi. Pop. 9000.

**Anura**, an order of tailless amphibia, including frogs and toads. They have been subdivided by Cope into 3 classes: 1. *Aglossa*, i.e. the African and tropical Amer. toads and fossil forms; 2. *Firmisternia*, i.e. frogs; 3. *Arctifera*, i.e. toads.

**Anuradhapura**, or **Anuradha**, tn., Ceylon, 80 m. N. of Kandy. From the fifth century B.C. to the eighth century A.D. it was the cap. of the is. It possesses the famous bo-tree, which is supposed to have sprung from the tree under which Gautama was transformed into Buddha. Pop. 7500.

**Anus**, the external termination of the rectum, or opening of the lower end of the alimentary tract. The aperture is closed, except during the act of defecation, by the external and internal sphincter muscles. A congenital closure of the rectum by an imperforate A. is sometimes met with in infants, but can usually be remedied by a simple surgical operation. Other affections of the part are spasm of the sphincter muscle, ulceration or fissure of the A., a pruritus ani, characterised by intense irritation. The usual treatment consists of strict attention to cleanliness and the use of suitable ointments.

**Anville**, Jean Baptiste Bourguignon d' (1697-1782), Fr. map-maker and geographer, was b. in Paris and became

geographer to the king. His maps and studies in anct. geography are still used. His chief publications are the *Atlas général*, 1737-80, and the *Atlas Antiquus Major*, with its 3 vols. of *Geographie ancienne*, 1769.

**Anwari** (fl. twelfth century A.D.), Persian poet, author of lyrical and satirical pieces collected under the title of the *Diwan*. He was a favourite of the sultan Sandjar, whom he followed in his expeditions. He was also an astrologer of some repute.

**Anweiler**, or **Annweiler**, a canton and tn. in the Bavarian Palatinate, Germany. The tn. is situated on the Queich near Landau, has a pop. of 4500, and before 1939 had manufs. of paper and leather. In the neighbourhood are the ruins of the castle of Trifels, where Richard Cœur-de-Lion was imprisoned in 1193.

**Anxur**, a thriving tn. of the Volsci, long before the Rom. Conquest, situated in Latium. It was taken by the Roms. 403 B.C. (Livy, iv. 59), retaken by the Volscians, 399 B.C. (Livy, v. 8), and again taken by the Roms. 396 B.C. (Livy, v. 13). It afterwards became a Rom. colony (Livy, viii. 21), under the name of Tarracina, or Terracina (q.v.).

**Anytus**, a wealthy leader of the Athenian democrats, and son of Anthemion. With Thrasylbulus he helped to overthrow the Thirty Tyrants. He was the most powerful of the accusers of Socrates (399 B.C.), and the Athenians, on repenting of the latter's death, sent A. into exile.

**Anzac**, the Australian and New Zealand Army Corps which served in the First World War, the word being formed of the initial letters of the corps. The 'Anzacs' most conspicuous service was rendered in the ill-fated Gallipoli campaign of 1915. The Corps effected a heroic landing under intense difficulties, at Gaba Tepe, later named Anzac Cove in memory of the exploit (Apr. 25, 1915, 'Anzac Day'). (See also GALLIPOLI CAMPAIGN.) After the evacuation they fought in Macedonia, on the Salonika front, in Egypt, and in France. In Egypt, a number of A. formed the force which, under Sir Charles Dobell, attacked the Turks at Gaza (1917). In France they fought with characteristic dash in the Somme battle, 1916, notably at Pozieres.

**Anzengruber**, Ludwig (1839-89), Austrian dramatist and novelist. B. in Vienna and became an actor at 19. His best work, mainly dealing with peasant life, was produced after 1867, after he had returned to clerical work in Vienna. *Pfarrer von Hirschfeld*, an anti-clerical play, made him famous in 1870, and was followed by *Meineidbauer*, 1871; *Kreuzschreiber*, 1872; *Die Tochter des Wuchers*, 1874; *Gewissenswurm*, 1874; *Hand und Herz*, 1875; *Der Schandfleck*, 1876; *Das vierle Gibot*, 1878; *Ein Faustschlag*, 1878; *Aus'm gewohnten Gleis*, 1880; *Der Sternsteinhof*, 1880; *Mahl und Stein*, 1889. He collected works were first pub. in 1880, and a biography by Bettelheim in the same year.

**Anzin**, tn., France, on the Scheldt, 1 m. from Valenciennes, in the dept. of Nord. It is the largest coal-mining centre in the country, and has extensive manufs. of machinery and metal industries. Pop. 14,800.

**Anzio**, Porto d' (anc. Antium, q.v.), seaport of Italy, 30 m. S.E. of Rome. It was a fishing tn. and a bathing resort of the Romans. Nero and Caligula were b. here. The modern tn. dates from the restoration of the harbour in 1698. Pop. 7700. The A. and Nettuno beachhead formed an important subsidiary front in the Allies' campaign against the Gers. in Italy in the Second World War. An apparent deadlock on the Ger. defensive line between the Apennines and the sea was resolved by the surprise landing of a strong detachment of the Fifth Army behind the Gers.' flank at A. and Nettuno (Jan. 22, 1944). The bridgehead thus estab., at the extreme range of allied support by fighter aircraft was heavily counter-attacked and the defenders passed through a precarious phase, but held out until, on May 18, other allied troops stormed Monte Cassino (see CASSINO, BATTLE OF), and burst through the Gustav line to effect a junction with them.

**Aomori**, see AWOMORI.

**Aonia**, tn. of United Provs., India, 21 m. S.W. of Bareilly. It contains the tomb of the Rohilla chief, Ali Mohammed, who d. in 1751. Pop. 14,000.

**Aorist** (Gk. *ἀόριστος*, indefinite), the Gk. tense used to express indefinite past time. It corresponds to the Eng. past tense, 'died,' 'went,' 'did,' and is specially suitable for the narrative style. The distinction between first and second A. was not observed in practice.

**Aorta**, the large blood-vessel leading from the left ventricle of the heart and sending arterial blood to all parts of the body. It ends by bifurcating into the common iliacs at the fourth lumbar vertebra.

**Aosta**, cathedral tn., N. Italy, in the prov. of Turin, 50 m. N. of Turin. Its anc. name Augusta Prætoria was derived from the colony founded there by Augustus in 25 B.C. The tn. possesses many relics of the Rom. settlement, amongst them the triumphal arch of Augustus, the prætorian gate, and the remains of an amphitheatre, while the present walls are very largely those built by the Romans. The cathedral dates from very early times. It was reconstructed in the 11th and much altered in later centuries. A. is notable as the bp. of Anselm, archbishop of Canterbury, and the scene of some of the labours of St. Bernard, who was archdeacon. The tn., though beautifully situated in a rich fruit-growing dist., is not altogether prepossessing in appearance, being cheerless and of irregular formation. The Val d'A., the delightful valley between the Pennine and Graian Alps, produces abundance of fruit and cattle, and has extensive mineral deposits.

**Aoudad**, a species of sheep with certain affinities to the goat. Red-brown in colour, with long hair hanging down from

the front of the neck and the base of the fore-legs. Has powerful horns and is fierce in character. Found in Abyssinia and the Barbary states.

**Apaches**, formerly a fierce and predatory tribe of N. Amer. Indians, inhabiting parts of N. Mexico, Arizona, and Texas. At one time very numerous, they have been largely exterminated, the survivors, numbering a few thousand, now being confined in the reservations set aside for them by the U.S. Gov. The name *apache* has more recently been applied to that peculiar criminal type, the Paris hoodigan.

**Apafi**: 1. Michael I., prince of Transylvania (1632-90). Chosen prince in 1661 and remained faithful to the Porte, under whose protection he reigned till after the siege of Vienna in 1683. In 1687 he obtained a declaration of Transylvanian independence under Austrian protection by a treaty with the Emperor Leopold I. 2. Michael II., son of the above (1677-1713). Succeeded to a war with the Turks, who were supporting Count Tököly's claim to the Transylvanian throne. A., with the aid of Austria, was victorious. In 1699 Transylvania was incorporated with Hungary.

**Apalachicola**: 1. A riv. of Georgia, U.S.A. The A. has 2 main branches, the Chatahoochee and the Flint, which rise in Georgia and meet at the extreme S.W. of the state, and that part which then flows through Florida into the gulf of Mexico is called the A.: length 70 m. 2. A city and port of Franklin co., Florida, U.S.A., on riv. and bay of same name. Noted for oyster, tarpon, and other fisheries. There is a monument to Gorrle, the physician, who discovered the cold-air process of refrigeration. Pop. (1925) 3000.

**Apanage**, see APPANAGE.

**Aparri**, port of Cagayan prov., Luzon, Philippines, on estuary of Cagayan R. The only serviceable harbour on the N. coast of the is. Pop. 21,000.

**Apathy**. The Gk. doctrine of A.—unruffled tranquillity of mind as a virtue—is generally associated with the Stoic school of philosophy. Yet it is really much earlier and there are clear indications of it in the Cynic school. Democritus describes human happiness in the same way as A. is described by later philosophers. This idea is in accordance with the general feeling of the Hellenistic period, which was always ready to recognize the happiness of the individual as existing in a kind of quietism. But this extreme view found opponents in Plato and others. Plato always deliberately opposed A. and later philosophers are strongly influenced by the more moderate attitude. In the eyes of the Neo-Platonists—especially Philo—A. appears as the highest stage of virtue. Modern psychologists describe A. as visceral anaesthesia. James argues that emotional A. keeps pace with sensory anaesthesia, assuming that a subject absolutely anaesthetic could experience no emotion. This—the James-Lange theory of emotion—is, however, opposed

by others. See e.g. Jas. Ward, *Psychological Principles*, 1920.

**Apatin**, a tn., Hungary, on the Danube, 49 m. S.W. of Szabadka and 125 m. S. of Budapest. Has a considerable trade in silk, hemp, and madder, and manufs. woollen cloth. Pop. 14,000.

**Apatite**, a mineral, very widely distributed, which consists mainly of phosphates of calcium. Most varieties correspond to the formula  $3\text{Ca}_3(\text{PO}_4)_2 + \text{CaF}_2$  or  $\text{Ca}_3(\text{PO}_4)_2 + \text{Ca}_3(\text{PO}_4)_2\text{F}$ , but sometimes the fluorine is replaced by chlorine. It crystallises in a hexagonal form, and crystals are sometimes found over a foot in length. When found in large masses, as in Norway and Canada, it is mined for the extraction of phosphates. It is always a constituent of gneiss, granite, and diabase, usually in minute crystals, and probably the phosphates in the soil are due to A. from the disintegration of such rocks.

**Ape**, a term used to denote (1) the anthropoid Aas. (*q.v.*), the short-tailed or tailless Aas. and monkeys (*q.v.*) and baboons generally; (2) more specifically, the most man-like forms, such as the chimpanzee, the orang, the gorilla, and the gibbons.

**Apeldoorn**, tn., Netherlands, prov. of Gelderland, 17 m. N. of Arnhem. Manufs. paper extensively, also blankets and woollen cloth. In the neighbourhood is Castle Loo, the royal hunting-lodge. Pop. (1939) 70,000.

**Apella**, the Spartan assembly of free-men. It was composed of all citizens of 30 years of age and over. It was convened once a month between the bridge of Babyca and the Cnacion, the ravine of the Cenus. As the anct. Homeric Agora had only been able to shout its assent or dissent, so the A., though assigned a real part in the constitution, could only vote by acclamation. Before the A. were laid the subjects approved by the Gerousia (the council of elders). Declarations of war, treaties of alliance, depositions of kings, etc., were within its cognisance. No one could speak in it without the invitation of the president—a feature also to be found in the Rom. Comitia. In historic times the ephors presided, but in Lyscurgus's day the kings and elders convened the meeting.

**Apelles**, a Gk. painter of the fourth century B.C. He was b. at Colophon in Ionia, and studied at Sicyon, near Corinth. Becoming a favourite at the court of Philip of Macedon, he was appointed by Alexander to be his portrait painter. As none of his works now remains, it is impossible to judge them other than by reputation, but A. seems to have been particularly skilful in drawing, composition, and simple but graceful colouring. Among his greatest pictures were 'Alexander wielding a Thunderbolt,' the 'High Priest's Procession at Ephesus,' and 'Aphrodite Anadyomene.' His idealism must have been remarkable, and he was renowned for his skill in technique.

**Apellicon** lived in the first century B.C., and was, according to Strabo, a

native of Teos, but he was admitted as a citizen of Athens. He was a Peripatetic philosopher, and a great collector of books. He purchased the library of Aristotle containing the MSS. of that philosopher and of his pupil Theophrastus; but his library was taken to Rome by Sulla when Athens was conquered 86 B.C.

**Apennines** (Lat. *Apenninus*), a long mt. range, often called the 'backbone of Italy.' Starting from the Maritime Alps, the A. run down the whole length of the peninsula, and are continued through Sicily, beyond which a line of submarine elevations connects them with the mts. of N. Africa. Their name is probably derived from the same root *pen* which is found so frequently in Celtic lands (as in Penmaenmawr). Though spoken of by early writers as a single range, the A. are now generally classed as N., Central, and S. The N. div. includes the Ligurian, Tuscan, and Umbrian ranges, of which the first runs round the gulf of Genoa, from the Maritime Alps to the valley of the Magra, near Spezia. Its highest point is Monte Bue, 5915 ft. Between the Maritime and Ligurian mts., and the sea lies the narrow strip of coast known as the Riviera, while on the N. they sent off many tribs. to the Po. The Tuscan A., reaching across the peninsula to the sources of the Tiber, are slightly higher than the Ligurian, Monte Cimone rising 7103 ft. A spur on the W., called the Alpi Apuane, supplies very fine marble, at Carrara. The chief rvs. of the Tuscan range are the Arno on the S., and the Panaro, Secchio, and Reno on the N. The N. end of the Umbrian range gives rise to 2 rvs. famous in hist., the Tiber and the Metaurus, which rise within a few m. of each other, but flow into different seas. The S. extremity of the range is not easy to define, as it becomes complicated with the great mass of the Central A. These, the loftiest in the peninsula, are broken up into sev. chains, of which the Gran Sasso has Monte Corno, 9580 ft., and Monte Amaro, 9170 ft., while the Sibillini and others have sev. peaks of 7000 and 8000 ft. The S. A. are very irregular, their chief ranges being the Matese (with Monte Miletto, 6725 ft.), the Lucanian (Monte Pollino, 7325 ft.), and the Calabrian. In these last, as in the Apuan dist., granite, gneiss, and other anct. rocks are predominant; elsewhere the whole system is mainly of Triassic and later formations, a great part being limestone. The A. are not metalliferous, but furnish valuable stone. On the W. there are many traces of volcanic agency, but the only craters now active are those of Vesuvius, Etna, and Stromboli. The highest peaks of the A. are covered with snow during great part of the year, but there are no glaciers. In former times there were large forests of pine, oak, chestnut, and beech, containing many wild animals, but much of the timber has been felled, and only wolves are now troublesome, though a few bears still remain. Much more dangerous were the brigands who flourished,

especially in S. Italy, down to very recent times.

**Apennines** (Lunar), an extensive mt. range similar in some respects to terrestrial features and visible to the naked eye when projecting into the dark part of the disk. It is 460 m. long and the highest summit, Huykhens, is 18,000 ft. high.

**Apennade**, a Dan. seaport and watering-place in Slesvig, on an inlet of the Little Belt; has a good harbour and considerable transport trade, beside fishing, shipbuilding, and other industries.

**Aperients**, medicines which stimulate the natural action of the bowels. Sometimes the term is applied only to those milder purgatives which only slightly quicken the movement of the bowels. In the wider sense they may be divided as follows: (1) laxatives, which have a gentle stimulating influence on the bowel muscles, as figs, prunes, olive oil, etc.; (2) purgatives, which increase the movements of the intestines, and mildly stimulate the glands, as castor oil, aloes, etc.; (3) drastics, which act more intensely, increase the intestinal fluid, and cause painful fluid motions, as jalap, podophyllin, and large doses of purgatives; (4) hydragogues, which cause free secretion from the intestinal glands, remove much serum from the blood-vessels, and cause watery motions, as croton oil and large doses of cream of tartar, Epsom salts, Glauber's salt, etc.; (5) cholagogue purgatives, which stimulate the liver and increase the bile, producing greenish liquid motions, as aloes, rhubarb, iridine, etc.

**Apetalous Plants** are those in which the corolla is suppressed.

**Apex Beat**, the stroke of the A., or point, of the heart against the pericardium, through which it can be heard and felt externally on the wall of the chest just below the breast. Deviations in the position or force of this beat afford important indications of pathological changes in the heart.

**Aphasia**, the partial or complete loss of the power of speech or of expression by writing, or of understanding spoken or written words. The term is not applied when the power is lost through lesions of the peripheral nerves or organs, but only when the central nervous system is affected. The memory-stores which enable us to use and understand the language we have so gradually acquired correspond with certain portions of the brain, and a consideration of the process of acquiring the power of speech will go far to explain why A. is so often restricted to certain functions connected therewith, while others remain intact. The child understands words before he can speak; these percepts are stored away in the brain in the first temporal convolution of the left-hand side in right-handed persons, and vice versa in left-handed persons. Later, the child learns to make the co-ordinated movements of the tongue, larynx, etc., necessary to pronounce a word. The memories of these movements are stored away in the foot

of the third left frontal convolution. When he learns to read, the visual memories of the words are stored in the cerebral cortex, and so on. In health, there is constant communication between these portions of the brain, so that the image of a written word calls up the memory of the spoken word and of the movements necessary to give it utterance. If a lesion in any one of these areas occurs there is a corresponding loss of power of expression or understanding. Thus the patient may recognise a word when seen, but be unable to pronounce it; or may be able to pronounce it, but not recognise the sound when uttered, and so on. The condition sometimes improves of itself as the lesion heals, but it often happens that the patient has to learn all over again, as a child does, the art of speaking, reading, or writing, whichever has been lost.

**Aphelion**, the position in the earth's orbit when the earth is furthest away from the sun. The orbit of the earth's revolution is an ellipse, with the sun in one of the foci. Thus the earth is at varying distances from the sun as it moves round in its orbit. It is nearest in Jan., when the earth is moving its fastest; and furthest in July, when the earth's motion in its orbit is the lowest. The first position is called *perihelion* and the latter *aphelion*.

**Aphemia**, or **Motor Aphasia**, inability to articulate words from disease of the cortical centre and not of the peripheral nerves or organs. See **APHASIA**.

**Aphides** (plural of *aphis*), a family of plant-lice belonging to the order Hemiptera, very common in Britain. They are characterised by their soft and oval bodies, small heads, jointed beaks, antennae of 7 joints, wings (when present) transparent and 4 in number. They feed on plants and from their food form an excretion, known as *honey-dew*, of which ants are very fond; in warm weather it may be seen like a coating of varnish on leaves, where it is injurious to the plant.

The aphides reproduce parthenogenetically and viviparously. In the early summer the unfertilised females may produce as many as 25 females alive in one day, and as these can also produce in a few days, their numbers increase enormously. In the autumn males begin to appear as well as females, and after mating the female produces a *winter-egg*, which in the spring develops into a female aphid—and again the cycle of generations begins. If it were not for birds, spiders, parasites, and ladybirds which prey on the aphides, probably all vegetation would be destroyed.

*Aphis* is the commonest type in Britain, but other well-known genera include *Phylloxera*, or vine-louse; *Nectarophora*, green pea-plant louse; *Phorodon*, or hop-plant louse; and *Chermes*, which produces galls on spruce fir. See G. B. Buckton, *Monograph of the British Aphides*, 1876-83; J. Davidson, *List of British Aphides*, 1925.

**Aphis-lion**, or lace-wing fly, is a member

of the Chrysopidae, order Neuroptera, which feeds on the aphides. The genus *Chrysopa* is common in Britain.

**Aphonia** (Gk. *ἀ-,* without, *φωνή,* voice), a medical term to denote loss of voice; it differs from mutism in which sufferers frequently utter inarticulate sounds. Growths in the larynx, paralysis of the respiratory muscles, disease of the vocal cords, hysteria, and nervous disorders may all cause this malady.

**Aphorism**, a general truth conveyed by means of a few telling words. The name was first used of the *Aphorisms* of Hippocrates, the opening sentence of which is 'Life is short, art is long.'



Anderson

#### APHRODITE: CNIDIAN VENUS

The statue by Praxiteles in the Vatican.

**Aphrodite**, the Grecian goddess of love and beauty, the Venus of Rom. mythology. Her name signifies 'sprung from the foam,' and her origin is thus described by Hesiod. A. was not only herself endowed with unsurpassed beauty and grace, but had the power to bestow beauty of form upon her favoured ones, a beauty which she bestowed upon Paris, with disastrous results to the Gk. Helen. She was the goddess of fruitfulness, and as such the patroness of marriage. At first she was regarded by the Gks. as the goddess of married life, but later simply as the goddess of sensual passion. These 2 ideas are represented in the Platonic idea of A. Urania and A. Pandemos. In Grecian mythology she is represented

as the daughter of Zeus and Dione, and as the wife of Hephaestus and the lover of Ares. There seems to be no doubt but that the goddess was originally of oriental origin. In the E. she was known by the names of Ishtar, Ashtoreth, Astarte, and practically all the attributes of Gk. mythology are ascribed to her in her earlier forms; her attributes of fruitfulness, her connection with the sea and moon all being emphasised in the E. ideas. The chief places of her worship were Cyprus and Cytherea. The sparrow and the swan, the rose, the poppy, and the lime-tree, were all sacred to her. Her most famous statue was that of Praxiteles at Cnidus, others being that of Melos (Milo) at Paris, the Capitoline Venus at Rome, and the Medicean Venus at Florence.

**Aphroditopolis**, see **ATFIEH**.

**Aphthæ** (Gk. *ἀφθαί,* eruption) is a disease occurring chiefly in infants, and is commonly called *thrush*. It is not usually serious, and cleanliness is the primary cure, with attention to diet and local application of glycerine and borax. See **THRUSH**.

**Aphthonius**, who lived at the end of the third and beginning of the fourth centuries, was a Gk. rhetorician of Antioch. He was the author of 40 Gk. fables and of *Progymnasmata*, an introduction to the study of rhetoric. It was first printed by the elder Aldus with the other rhetoricians, *Rhetores Græci*, Venice, 1508, and was in common use until late in the seventeenth century.

**Apia**, a seaport on the N. coast of Upolu, W. Samoa, cap. until 1914 of Ger. portion, but assigned to New Zealand under mandate by the treaty of Versailles. It is built on a curving bay, backed by a conical hill. Vaea, the burial place of Robert Louis Stevenson, beyond which rise the slopes of the high mt. range. Copra and cocoa beans are exported. Under the mandatory administration the sanitation of A. has been greatly improved. There is a water-supply, sewerage system, hydro-electric plant with electric lighting, and other modern conveniences. The tn. has 2 motion-picture theatres, sev. transport companies, engineering works, and other business enterprises. There is a high-power wireless station. Foreign consulates were set up in A. in the eighties of last century, a step which so exacerbated the traditional rivalry among the native clans as to lead to a dangerous crisis, and Britain, America, and Germany sent warships to A. (1899). In Mar. of that year 4 Ger. and Amer. warships were sunk by a hurricane, and only U.M.S. *Calhoun* escaped destruction. In 1899 there was a recurrence of the frequent trouble over the kingship question, when Mataafa, a Catholic exile, opposed Malietova, youthful son of the late king. Britain and America favoured Malietova, and when this led to a crisis Brit. and Amer. warships bombarded A. Pop. 2000. See Felix M. Keesing, *Modern Samoa*, 1934; R. Gibbings, *Over the Reefs*, 1948.

**Apian**, Peter (1495-1552), an astronomer, and, we may add, astrologer, b. at Leipzig. His real name was Hienewitz. *Biene* in Ger. signifies a bee, whence the Lat. *apianus*, the full form of his name. He is principally remarkable for his observations of comets, and is said to have been the first who observed that their tails are generally turned from the sun; but this had been previously noticed by Fracas-toro. He also attempted the solution of astronomical problems by mechanism as described in his *Opus Cæsareum*, and pointed out, in his *Cosmographia*, the use which might be made of lunar observations in finding long.; he d. at Ingoldstadt, where he was prof. of mathematics.

**Apiary** (Lat. *apis*, bee), a place for keeping beehives. The name is derived in the same way that an aviary is taken from *avis*, a bird. Bee-keepers disagree as to the best position of the A., but all maintain it should be impervious to winds.

**Apiaster**, an old name for the bee-cater in general: now confined to *Merops apiaster*.

**Apicius**, the name of 3 Roms. celebrated for their gluttony. The first lived c. 92 B.C. The second c. A.D. 14, and the third about the middle of the first century.

The second is the most famous, M. Gabius A., who, after squandering his fortune in gluttony, committed suicide because he would not be able to satisfy his appetite on the pittance left. His name has become proverbial for gluttony. (Tac. *Ann.* iv. 1; Dio Cass. lvi. 19; Athen. p. 7; Pliny, viii. 209, ix. 66, xix. 137; Juv. iv. 23.)

**Apiin** (Lat. *apium*, parsley), the peculiar principle of parsley, obtained from it by solution in water. It crystallises in colourless needles, without taste or smell. It is soluble in boiling water or alcohol, insoluble in ether.

**Apocrinidae** (Gk. *amion*, pear, *apivon*, lily), a family of crinoid fossils of the order Articulata. The stem is long and rounded, the calyx unsymmetrical and composed of heavy plates. They occur chiefly in the Jurassic and Cretaceous systems.

**Apion**, a Gk. grammarian who studied at Alexandria and who lived during the reigns of Tiberius and Caligula. He was a determined opponent of the Jews, and was sent on one occasion to Rome at the head of an embassy to complain to the Rom. emperor (Caligula) of the Jews, and was the author of a number of works, only fragments of which remain, the story of *Androclus* and the *Lion* (Gellius, v. 14), and the *Dolphin* at *Dicæarchia* (Gellius, vii. 8); with fragments from the work against the Jews preserved by Josephus in his reply.

**Apis**, the sacred bull of Memphis. The origin of the worship of the bull *Hap*, called by the Gks. A., is unfortunately hidden in obscurity. He is said to have been held in honour by Mena, the first historical king of Egypt, and to have been raised to godship by Kaiekbos, a king of the second dynasty. Herodotus says A. is 'the calf of a cow incapable of conceiving another offspring'; the Egyptians

say that 'lightning descends upon the cow from heaven and from thence it brings forth A.' Living and dead A. was closely associated with Osiris. A. became known by the Gk. name of Serapis, and was accounted the husband of the goddess Isis. Special marks were found on the sacred bull A., e.g. it was black, had a white square on its forehead, on its back the figure of an eagle, and on its tongue a beetle. It was cared for with all honour; from its manner of approach, from its movement in its stall, from the manner in which it received food from visitors, the auguries were taken. Its birthday was celebrated by a 7 days' feast. Its death plunged the whole kingdom in mourning. It was the re-incarnation of the god Osiris, and was therefore worshipped as such. From modern researches we find that the bodies of the sacred bulls were mummified with all care, and at the Serapeum 2 galleries measuring together 1200 ft. were found in which the bodies of the sacred bulls had been placed.

**Apium**, a genus of plants belonging to the Umbelliferae, found in ditches in Britain, and nearly every part of Europe. *A. graveolens*, the only important species, is the celery; in its wild state it is poisonous, but when cultivated it becomes harmless.

**Aplanatic Lens**, a lens which is free from spherical aberration.

**Aplerbeck**, a suburb of Dortmund in Westphalia, Germany, with coal mines and iron works.

**Apneumatosis**, see COLLAPSE, PULMONARY.

**Apnoea**, a technical term for the suspension of breathing. It denotes the prevention of breathing owing to the presence of too much oxygen in the blood.

**Apocalypse**, lit. trans. a revelation, i.e., something revealed only to a chosen person. The term is usually applied to the last book of the N.T., which is often referred to as the A. of St. John. In the Eng. Bible, however, the name the Revelation of St. John the Divine is given to this book. The term, however, was used at a much earlier period by the Jews to indicate a number of writings which, in the form of parables and prophecy, were supposed to reveal the end or the future state of the world. This apocalyptic literature is found in both the O.T. and the N.T., and was originally the outcome of the Hellenistic Jews. It differed very essentially from the prophetic writings, since the prophets emphasised the need for repentance, and the utter wickedness of the times; while the apocalyptic writers despaired of the present, but put their whole trust in the deliverance and reward which was to be the gerdon of the sufferings and sorrow of the present. Among the canonical books of the O.T. we may mention as apocalyptic writings parts of Isaiah and of Ezekiel and the book of Daniel; amongst the uncanonical, the book of Enoch and the Psalms of Solomon. We find also in Christian times a number of writings which are classed as apocalyptic writings, and which

are outside the canon. Amongst those in the canon are parts of St. Mark and of Thessalonians and the Revelation; outside the canon we find a number of books, altogether about a dozen, which are also called apocalyptic writings, and amongst which are found the Shepherd of Hermas, and the Revelations of Bartholomew.

**Apocalyptic Number**, or 'the Number of the Beast', is the mystical number 666 (see Rev. xiii. 18). There have been various interpretations of this mystery. In Gk. and Heb. the letters of the alphabet were used for numbers, and so 'the number of the beast': for it is the number of a man' was the value of the letters composing the name. The most generally accepted solution is 'Neron Kesar,' the Heb. for the Lat. 'Nero Caesar.' In anct. Heb. the vowels 'e' and 'a' are not represented, but 'o,' being a long vowel, is. The value of the letters N R O N K K S R is therefore  $50 + 200 + 6 + 50 + 100 + 60 + 200 = 666$ . Another interpretation has been made from the Gk. word 'Lateinos,' meaning the Rom. empire.

**Apocatastasis**, in the theological sense the extension of the kingdom of God over all the earth at the appointed time, i.e. the ultimate conversion of the whole world to the Christian faith.

**Apocrypha**, a word of its wider application used to denote spurious Heb. literature, but technically restricted to mean books which were included in the Septuagint (Gk. O.T.) and the Vulgate (Lat. O.T.), but were not included in the Heb. canon. A general reference to the word A. means usually the A. of the O.T., but there is also much apocryphal literature in connection with the N.T.

The A. of the O.T. as used by Protestants includes the following books: 1 Esdras, 2 Esdras, Tobit, Judith, additions to Esther, Wisdom of Solomon, Ecclesiasticus, Baruch, the Song of the Three Holy Children, the History of Susannah, Bel and the Dragon, the Prayer of Manasses, 1 Maccabees, 2 Maccabees. The sources of these books are various, some showing Persian and Grecian influences, whilst others remain entirely Hebraic. Most of the books date from the first or second century B.C., and fall practically into 3 divs.: (a) Historical, (b) Legendary, (c) Didactic or Philosophical.

The books of the A., whilst not of the same value as the canonical books, nevertheless give us a glimpse into the religious life and ideas of the Jewish race. They show us a race rising from misfortune with unshaken faith and relying always on the promise given them that they were still the chosen race and must ultimately triumph. They give us also the beginning of the change from the law of the old dispensation to the law of the new. A transition from the old Jewish standpoint to the new.

The early Gk. fathers gave as much attention to the books of the A. as they did to the canonical books until the council of Laodicea. After this council the books of the A. were treated as being strictly uncanonical. But in the W.

Church Jerome declared that all books outside the Heb. canon were apocryphal, whereas Augustine declared that the apocryphal books simply implied those books whose origin was unknown or obscure. Another view declared that the books of the A. were valuable for their moral teachings, but were not to be regarded as a part of the canon. Diverse opinions were held right down until the period of the Reformation. At the Council of Trent the opinion of Augustine was strongly upheld and the books of the anct. Lat. Vulgate were declared canonical and sacred. That is, the whole of the books of the A., with the exception of 1 and 2 Esdras and the Prayer of Manasses, were declared of equal value with the canonical books.

The Protestants, however, remained firm in the belief that only the books of the Heb. canon were sacred and scriptural. Wycliffe declared that all books save those of the Heb. canon should be set among the A., that is, books 'without authority or belief.' Luther denied them to be as sacred as the Scriptures, but deemed them valuable because of their good moral teaching. This later attitude seems to be the one more closely adopted by the Protestants, since in the early Protestant eds. of the Bible the A. is given, but given apart from the canonical writings. Further, the sixth article of the Church of England states that other books of the church may be read for the sake of example and teaching, but not for the establishment of doctrine. The A. is regarded by a large number of orthodox people, however, not merely as uncanonical, but as inimical to the inspired word of God.

In addition to the A. included in the Septuagint there are also a number of books included in apocryphal literature. Amongst these may be mentioned History of Joannes Hyrcanus, Book of Jubilees, Books of Adam, Jannes, and Jambres, Joseph and Asenath, Perse Alseth.

**Apocrypha of the New Testament.** The numerous unauthenticated Christian writings, among which is the Epistle of Clement. This is founded largely upon the Epistle to the Hebrews, and written in imitation of the Pauline epistles. It throws an interesting light upon the doctrines of the early Christian Church. The second epistle is the first example of an early Christian homily. It differentiates between the books of the O.T. ('Biblia') and the books of the N.T. ('Apostles'). The Epistle of Barnabas is supposed to have come from the pen of Paul's companion, but this authorship has been shown to be spurious. It attempts to prove the complete overthrow of Judaism. The Shepherd of Hermas is supposed to have been written by that Hermas who is mentioned by Paul in the Rom. epistle. It consists of a series of orisons, but its chief interest lies in the fact that it gives us some insight into the working and doctrine of the early Rom. Church. The Gospel of Peter and the Revelation of Peter: both these books are uncanonical. The Protevangelium of James is an

account of the wonders dating from the birth of Mary to the birth of our Lord. The Gospel of St. Thomas deals with the infancy of Christ, and gives accounts of the miracles of that period. The Gospel of Nicodemus is divided into 2 parts. The first contains an account of the trial of Christ before Pilate. This part is called also *Acta Pilati*. The second part is supposed to be the narrative of Simeon and his 2 sons, who rose from the dead after the resurrection of Christ and who relate the happenings in Hades on the descent of the Christ.

**Apocynaceæ**, a natural order of monocotyledonous plants which are chiefly tropical and usually form shrubs. All species contain latex, generally of a poisonous nature, in 2 cases being nuxvomica and the tanguin poison. The characteristics of the flowers of this order are that they are symmetrical, monoclinous, in whorls of 4 or 5; the fruit consists of 2 follicles or a berry. The formula is  $K(5)C(5)A5G(2)$ .

**Apodes**, an order of fishes. According to the Linnean system it includes all those without the ventral fins. Cuvier restricts the order to those which, besides this character, are likewise malacopterygious, and according to this classification the eel, muraena, and gymnotus are examples.

**Apodictic**, a logical term applied to a conclusion which is necessarily true, i.e. the opposite of which is impossible.

**Apogamy** is the curious condition met with in some ferns, e.g. in *Nephrodium Filix-mas*, the shield fern. In this case the new fern-plant arises directly as a bud from the prothallus without aid of sexual organs. In other cases A. is effected parthenogenetically, the new plant arising from an unfertilised oosphere. See also APOSPORY.

**Apogee** (from Gk. *apo*, from, and *gē*, the earth), another term for *aphelion* (q.v.) and used more particularly in speaking of the moon.

**Apolda**, a Ger. tn. and political dist. in Thuringia. About 9 m. N.E. of Weimar. Manufs. cloth and hosiery. Had also dye-works, bell foundries, and manufs. of steam engines and bicycles. Pop. about 25,700.

**Apollinaire**, Guillaume (1880-1918), Fr. writer. His real name was Wilhelm Apollinaris de Kostrowitzky, he being the natural child of a Polish woman and a priest of Monaco. He was b. in Rome. He wrote legends on his early years and all that is certainly known of him is that he had travelled much before he came to Paris in 1902 and allied himself with some of the younger and more advanced writers and artists. He was either the inventor or the chief protagonist of Cubism. He conducted a regular dept. in the famous Fr. magazine *Mercur de France*. When the First World War broke out he served at the front, and was so badly wounded in the head that his skull had to be trepanned twice. He wrote fantastic prose and verse with equal facility. Prin. works: *Alcools* (poems), 1913; *Calligrammes* (poems), 1918; *Contes choisis*, 1923.

**Apollinaris, the Younger**, bishop of Laodicea in Syria. A bitter opponent of Arianism. This controversy took him so far that he even opposed the orthodox position of the Catholic Church. His denial of the existence of the human element in Christ's nature led to his condemnation by Catholic synods. He d. about 390.

**Apollinaris Sidonius** (d. c. 488), a Christian author and bishop of the fifth century. B. in Lyons about the year 431, of noble family, he was connected by marriage with the Emperor Avitus. His learning, however, saved him when Lyons was captured by Majorian, as it did later when Rome fell into the hands of the Goths. He became bishop of Clermont. A number of his works are still extant.

**Apollinaris Water**, an alkaline mineral water from the A. spring in the valley of the Ahr, Rhine Prov., Germany.

**Apollo**, the god of the ideal arts and activities in classical mythology. A Gk. legend describes him as the son of Zeus and Leto. Leto, wearied by her flight from the jealous anger of Hera, sank exhausted on the isle of Delos and gave birth to A. The is., heretofore a barren rock, sprang to life and covered itself with golden flowers in honour of the birth. A. is represented as being many-sided. Homer describes him as a sender of plagues; he is also described as the god of prophecy, the god of shepherds, the god of music, and the god of medicine. He was held in honour as a great athlete, the winner of the first Olympic race, and the founder and builder of cities. Troy was supposed to have been built by his aid. As A. Delphinus he was held in reverence by sailors as the god of light who helped them over the dark and dangerous sea. As the god of light he was also the god of purity, and demanded purity of worship from his followers. He was also the god through whom the taint of crime could be removed. In later Gk. mythology he is the sun god, but earlier mythology has a distinct sun god, Helios. The bow and the lyre are the usual attributes of A.; the bay, the palm, the roe, the swan, the snake, the mouse are all sacred to him.

The most famous representation of A. is the A. Belvedere, an imitation of an early bronze statue, which shows him, bow in hand, diving back the Gauls from his temple at Delphi. In the A. Citharæus, A. is represented in flowing robes and almost feminine in form. The usual statue of A. represents him as the type of the ideal Gk., handsome, tall, and perfectly proportioned.

**Apollo of Rhodes**, a colossal bronze figure of the sun god, reckoned among the 7 wonders of the ant. world. It is said to have been the work of Charos of Lindus and to have been set up by the Rhodians about 280 B.C. in gratitude for the successful defence of the city against Demetrius. The height was probably about 90 ft., and the work is stated to have occupied the sculptor 12 years. In 226 B.C. it was overthrown by an earthquake, and the metal was sold by Arabs when they captured Rhodes in A.D. 653.



**Apollodorus**, an Athenian painter of the end of the fifth century B.C. He introduced some innovations in perspective and light and shade. His works include an *Odysseus*, and an *Ajax* struck by lightning.

**Apollodorus**, a grammarian of Athens who fl. c. 140 B.C. He wrote a book on the mythology of the *Gks.*, in addition to a number of grammatical treatises and a book on geography. His extant *Bibliotheca* is regarded by authorities as only part of a larger book which has been lost.

**Apollodorus**, a famous architect of the second century. He was b. at Damascus. He became a favourite of the Emperor Trajan, for whom he constructed a bridge over the Danube. He also designed a number of buildings and triumphal arches. He offended the Emperor Hadrian by his outspoken denunciations, and on Hadrian's accession he was put to death on trivial charges.

**Apollonia**: 1. Anct. city of Illyria, near mouth of R. Aous. Colonised by Corinthians and Corcyreans, and famous as a Rom. place of learning. 2. Anct. city of Thrace, on the Euxine. Colonised by emigrants from Milesia. The famous statue of Apollo was removed from here to Rome by Lucullus, 72 B.C. The site is now occupied by *Sandoli*. 3. Anct. port of Cyrene, now *Marsa Suza*.

**Apollonicon** (from *Apollo*), a powerful chamber organ with both keys and barrels, manuf. by Messrs. F. Light & Robson in London, and first exhibited by them in 1817. It could be played by an organist, and was also a self-playing instrument, being provided with 2 revolving cylinders studded like those of a barrel-organ. It had 45 stops and 1900 pipes. Taken down about 1840.

**Apollonius Dyscolos**, or the *Sturdy*, famous grammarian of Alexandria, second century A.D. He lived during the reigns of Hadrian and Antoninus Pius. He was the first grammarian who introduced system into grammatical treatment. He is called *grammaticorum princeps* by Priscian, by whom he is followed somewhat closely. His works have been ed. by Bekker and Schneider.

**Apollonius of Perga**, a celebrated geometer of the Alexandrian school. He was b. some 25 years later than Archimedes, i.e. c. the year 262 B.C. He is classed with Euclid and Archimedes as one of the founders of mathematical science. His chief work is a book on conics which gained for him at the time the title of the 'great geometer,' and which has preserved his fame. His book on conics is the only one of his works which has come down to us, although the names of others have been preserved by later writers.

**Apollonius of Rhodes**, a Gk. poet and grammarian, b. in Alexandria, who fl. between the years 222 and 181 B.C. His most famous work was a poem on the legend of the Argonauts called the *Argonautica*. He received his title of Rhodius from the people of Rhodes, amongst whom he lived for some considerable time after

having left Alexandria in disgust at its unfavourable reception of his *Argonautica*. He left Rhodes in order to become librarian at the museum at Alexandria, whither he was recalled. His poem the *Argonautica* was a favourite with Rom. writers, and although in later days it has received somewhat harsh criticism, such criticism is not altogether deserved.

**Apollonius of Tyana**, a Gk. philosopher. He was b. a few years before the Christian era. He studied at Tarsus, and became a follower of the doctrines of Pythagoras. He claimed for himself a divine mission, and gathering around him a number of disciples, he travelled widely in the east, visiting Nineveh, Babylon, and India, where he came under the influence of oriental teaching. When he returned he was received with great honour, and many miracles were ascribed to him. He himself assumed only prophetic vision. He was patronised by Rom. emperors, and during the height of his fame traversed W. Europe. Later, after being accused of conspiring against Nero, he retired to Ephesus, where he opened a school, and where he d. at the age of nearly 100 years. By Blount and Voltaire he was held to be the superior of Christ. His biographer Philostratus gives an account of his life, which must, however, be stripped of its exaggeration and fiction before we can see a glimpse of the earnest striver after a higher life. See C. Bigg, *The Origin of Christianity*, xxii., 1909.

**Apollonius of Tyre**, the name of a medieval tale which is supposed to have a Gk. origin. The first mention of the tale seems to be about the latter end of the sixth century. The story relates how A. of T., having solved the riddle set him by King Antiochus, has to flee in order to escape the wrath of the king. In Cyrene he marries, and on the death of King Antiochus, he goes to claim Antioch, to which kingdom he is heir. On the voyage his wife apparently dies in giving birth to his daughter. The corpse is thrown overboard and the daughter left at Tyre. After 14 years of vicissitudes the three, husband, wife, and daughter, are miraculously restored to each other. The story had great popularity during the Middle Ages in almost every country. Shakespeare used it in his drama called *Pericles*.

**Apollon**, an Alexandrian Jew described in the Acts of the Apostles (xviii. 24-28). He is said to have been an eloquent speaker and a man mighty in the Scriptures. Until his 'conversion' by Priscilla and Aquila he appears to have preached only the baptism of John. There remains still some doubt as to exactly what form this 'conversion' took, since he appears always to have been a Christian. He became a follower and fellow teacher with Paul, and a great deal of his work was done in Corinth, where he gained great influence (1 Cor. iii. 4). It is held by some that previous to his conversion he wrote the Wisdom of Solomon, while Martin Luther believed him to be the author of the Epistle to the

Hebrews, a view which has received much support.

**Apollyon** (Gk. Ἀπολλύων, meaning destroyer). This name is given in Rev. ix. 11 as a translation of the Heb. 'Abaddon,' 'the angel of the bottomless pit.' A. forms a striking figure in Bunyan's *Pilgrim's Progress*. His identification with the Asmodeus of Tobit seems doubtful.

**Apologetics**. From the earliest ages the Christian faith has been subject to attacks, varying in character with the changes of thought produced by centuries of national, eccles., and philosophical strife. These attacks have in turn called forth defensive works, written from many different points of view, and often disagreeing with each other in important respects, but still having one common aim, that of upholding the main doctrines of Christianity. Such defences have received the general name of A., from the Gk. ἀπολογία, a defendant's personal reply to his accuser, e.g. Plato's *Apology of Socrates*. Of course, defence has often taken the form of a counter-attack, as when we find Paul denouncing the grossness of paganism. A full hist. of Christian A. would trace the moral and intellectual development of Europe, Asia Minor, and N. Africa during 2000 years, with its continuous effect upon religious thought. Arguments accepted as profound by one age often appear trivial to another, having been founded on premises which fuller knowledge has disproved.

In early ages we naturally find the Christians defending themselves against 2 main lines of attack, those of Jewish and pagan opponents. By the former they are looked upon as renegades and blasphemers, the latter accuse them of law-breaking, sedition, impiety, atheism, secret immorality, and 'foolishness' (1 Cor. i. 18). In reply to the former, O.T. hist. and prophecy were largely employed by Paul and his colleagues, while the Gks. were referred to the highest philosophy of their own writers, which inculcated pure morality, an exalted idea of the deity, and a belief in the immortality of the soul. This was pointed out not only as an acceptable form of natural theology, but as being supported by divine revelation. Some of Paul's chapters (e.g. Rom. xiii.) seem intended as specific answers to some of the pagan accusations. Among the most famous apologists of the early Church were Justin Martyr, Origen, and St. Augustine. The latter's work, *De Civitate Dei*, did much to establish the W. Church on a permanent footing.

During the Middle Ages, while pagan enemies had become extinct, Jewish and Moslem authors well instructed in Gk. philosophy took up new lines of attack. Christian writers had maintained that faith and reason must necessarily be in harmony, but now began the controversies concerning 'natural' and 'revealed' religion which have lasted to the present day. Among the great Moslem and Jewish names are those of Avicenna,

Averroes, Maimonides, and Jehuda Halevi; on the Christian side Anselm, Abelard, Albertus Magnus, and Thomas Aquinas. The main result to Christendom of these controversies was what is known as the 'Thomist compromise,' which declares that certain doctrines are beyond the sphere of reason. The 'nominalists,' William of Occam, Buridan, and others, going further still, asserted *all* matters of faith to be above argument. The Church of Rome, on the whole, sided with the Thomists. Since the revival of learning, the growth of modern philosophy and science has had immense effect on religious thought. The rise of deism, a new presentation of 'natural theology,' was contemporaneous with that of Jansenism, which sought to put new wine into old bottles by accommodating the ideas of Augustine with the modern claims and teaching of the Vatican, and also to some extent with certain tenets of Protestantism. The greatest of the Jansenists was Blaise Pascal, a staunch Christian and Rom. Catholic, yet his colleagues of Port Royal were subsequently persecuted as heretics at the instigation of Rome. Deism may be looked on as a natural reaction among those who had imbibed Protestant ideas of freedom against the extreme views held by some of the 'supernaturalists,' and this, with pantheism and other allied forms of teaching, had many advocates, some of them men of high abilities—Lord Herbert of Cherbury, Spinoza, Thomas Hobbes. These were succeeded by others who went further and preached downright atheism. John Locke, while a sincere believer in Christianity, argued in its favour on the ground of reason, and objected to miracles being urged in support of doctrine.

The deists were answered by many writers, both Eng. and foreign; of the former William Law, Butler, and Paley were the most renowned, Paley's *Evidences* becoming a standard text-book. In Germany Lessing and others sought to 'rationalise' Bible interpretation. Kant (followed by Coleridge) tried to give this movement a new and more spiritual form. Some Ger. critics have thrown over 'natural theology' altogether in favour of revelation.

But agnosticism and the new criticism, the most recent forms of objection to 'orthodox' Christianity, are based on the modern discoveries of science and of historical research. The conflict between science and theology is no new one—Galileo was not the first to suffer in it—and though Huxley invented the word agnosticism in 1896, the *idea* is to be found in anct. Gk. literature, though the sophists argued on other lines and against other ideals.

The view taken by Spencer and Huxley is that concerning the deity, and also concerning many things of which we can have no *sensible* perception, we can have no actual proof of certainty. But the theologian replies that physical and spiritual knowledge are so entirely different that we cannot argue from one to the other.

The new criticism (founded on close study of the N.T., assisted by discoveries of ant. MSS., and a minute collation of those already known) began in Germany, and has extended to France, England, and America. Among well-known writings on the subject are the *Lives of Christ* by Strauss and Renan, Seeley's *Ecce Homo*, Garvie's *Ritschlian Theology*, R. Mackintosh's *Primer of Apologetics*, and Bruce's *Miraculous Elements in the Gospels*.

**Apologia pro Vita sua** (apology for his life), the autobiographical sketch of his position in the Oxford Movement, issued by Cardinal Newman in 1864. It contains his reasons for joining the Rom. Catholic Church, and characteristically refutes Charles Kingsley's accusations, which were the immediate cause of the *Apologia*. See Everyman's Library ed. and recent biographies by Robert Sencourt and Maisie Ward, 1948.

**Apologies of the Fathers** are writings in defence of Christianity from the beginning of the second to the sixth century. They had as their objects to uphold Christianity against heathenism, to refute the false accusations made against Christians, and to show emperors the injustice of persecution. Among the Gk. apologists of the second century were Justin Martyr, who wrote *Apologia Prima pro Christianis* and *Apologia Secunda*. The two, usually referred to as one *Apologia*, were written c. 150. Athenagoras, who defended the Christians against the charges of atheism, incest, and infanticide; Tatianus; Theophilus of Antioch; and Ilermas. Amongst the Lat. apologists of the second century were Tertullian, the author of *Apologeticus*; Minucius Felix, who wrote the dialogue entitled *Octavius*; and Cyprian, the author of *On the Absurdity of Idolatry*. In the fifth century Origen, a Gk., and Ambrosius, a Lat., wrote against the attacks of Celsus, Porphyrius, Hierocles, and Julian, who attacked the hist. and doctrines as well as the morals of the Christians. The greatest of these fathers was Eusebius, whose *Evangelical Preparation* contains, in 15 books, the introduction to his *Evangelical Demonstration*, in 20 books. He explains the harmony between the O.T. and N.T., and upholds the teachings of Christ and of His disciples; and he examines the *Life of Apollonius of Tyana* by Philostratus. Other apologists were Athanasius, Chrysostomus, Cyrillus of Alexandria, and Theodoret, who argues for Christianity from the writings of the heathens. Lactantius wrote *Divine Institutions* in 7 books; St. Augustine *On the City of God* in 22 books; and St. Jerome refutes the objection that no distinguished individuals embraced the Gospel. The work entitled *The History of Orosius* contends that plague, famine, and earthquakes were not the outcome of the Gospel.

**Apologue**, a fabulous story, in which a worldly-wise or moral lesson is conveyed in a lively, dramatic, and often satiric manner, the characters employed

being generally of a lower order than man. See Jotham's so-called parable (Judges ix.), also the fables of Aesop and others, and the Ger. *Reineke Fuchs*. A true 'parable' is more spiritual in its teaching than an A.

**Apology** (*ἀπολογία*), a Gk. word originally signifying a defence made in a court of justice by or for a person accused, e.g. Plato's *Apology of Socrates*. The word was also used for a work in defence or justification of what might be considered wrong, or be disapproved, e.g. Tertullian's *Apology for Christianity*, Bishop Watson's *Apology for the Bible*, and Barclay's *Apology for the Quakers*. In ordinary language it is used in the sense of asking pardon for an offence.

**Apomorphine** ( $C_{17}H_{17}O_3N$ ), an artificial alkaloid, derived from morphine by the abstraction of a molecule of water. It is administered hypodermically or by the mouth to produce vomiting, and is therefore an emetic. It is also used as an expectorant, and is of great value in acute catarrhs attended with very viscid secretion, and particularly in cases of bronchitis and croup in children.

**Aponogeton**, a species of pondweed (*Najas*) found at the Cape, where it occurs in sev. varieties. The *A. distachyon* is a favourite aquarium plant, having sweet-smelling white flowers and bright green floating leaves.

**Aponus, Petrus**, see ABANO, PIETRO DI.

**Apophthegm**, or **Apothegm** (*ἀποφθέγμα*), a Gk. word signifying 'a thing spoken out.' It is a short, pithy, and instructive saying, intended to convey an important truth to the hearers. Plutarch made a collection entitled *The Apophthegms of Kings and Generals*, and also of the Aes. of the Lacedaemonians entitled *Laconica*. Cicero called them *salutae*, salt pits. The following are examples: 'Bigotry murders religion, to frighten fools with her ghost.' (Colton's *Lacon*). 'We ask advice, but we mean approbation' (*Lacon*). Bacon made a collection entitled *Apophthegms New and Old*.

**Apophyge** (from the Gk. *ἀποφύγειν*, to flee away), a term applied by architects generally to a concave surface lying between or connecting 2 flat surfaces not in the same plane, and particularly to a slight concavity which is almost invariably found to terminate the shaft of an Ionic or a Corinthian column both above the base and under the necking. The more familiar Eng. term is *escape*, and the Fr. term is *congé*.

**Apophyllite**, a mineral consisting chiefly of calcium silicates, and corresponding to the formula  $4H_2CaSi_2O_7 + KF + 4H_2O$ . It occurs generally in association with the zeolites, and large crystals have been found in India, Mexico, and the Harz Mts.

**Apophysis**, in physiology a protuberance or process on a bone, having no independent centre of ossification, and so forming a continuous part of the bone. Especially applied to the spinal vertebrae. In botany, a swelling of the seta below the theca or spore case in certain mosses,

or on the scales on the cones of certain pines.

**Apoplexy**, 'a clinical term used to indicate a condition characterised by sudden paralysis, usually attended with loss of consciousness, and due either to the breaking of blocking up of a blood-vessel in the brain.' This definition, suggested by Dana, divides A. into cerebral hæmorrhage and brain softening caused by the blocking up of a blood-vessel.

The predisposing causes of cerebral hæmorrhage are alcoholism, syphilis, and gout, and the immediate cause is general physical strain or mental excitement. It occurs usually after the age of 40, although it is commonly met with at birth and during early childhood. Generally, the patient is seized without any warning, and consciousness is usually lost at once. The patient falls, the face is often congested, one side of the body is paralysed, according to the position of the hæmorrhage, and the breathing becomes stertorous. The condition may last without much alteration for a day or two, after which there are signs of inflammation in the affected area, fever and delirium may set in, and occasional spasmodic movements may be made. Death may occur at any stage, but the structural damage may be slowly repaired, though the paralysis seldom disappears altogether.

The treatment consists in placing the patient in the position where there is least constriction. The clothing should be loosened, the head somewhat elevated, and care should be taken that the paralysed tongue does not fall back into the throat. Ice bags may be placed round the head, and hot-water bottles at the feet. The bowels should be made to move freely, calcium salts may be given to promote coagulation of the blood, and nitroglycerin to reduce the blood pressure.

Acute cerebral softening may be brought about by a blood-vessel being plugged up with material brought to the brain by the blood current, or by obstruction caused by clotting in the arteries or veins. The blood is unable to nourish properly a portion of the brain, and varying degrees of softening take place. If the condition is due to the sudden plugging of an artery, the onset is sudden and there may be loss of consciousness, or vertigo. Where clotting takes place the onset is more gradual; there may be headaches, great depression, and confusion of mind. The outlook is more promising than in hæmorrhage, death not being so likely to occur and the resultant disability being less.

**Aposiopesis**, in rhetoric, the abrupt ending of a sentence, which is left unfinished, for the sake of greater effect.

**Apostasias** are herbaceous plants belonging to the family of the Apocynaceæ; they originally came from the mountainous forests of Java and the Penang Islands.

**Apostasy**, among the Gks. this word originally meant a defection from the military standard, but later and more

generally a lapse from Christianity, especially if from unworthy motives. In the Rom. Church it was specially used for the renouncing of monastic or clerical vows. Julian the Apostate (331-63) attempted to displace Christianity for paganism; whence his surname.

**A posteriori**, *see* **A PRIORI**.

**Apostle** (Gk. ἀπόστολος), a messenger or envoy. A title now specially applied to teachers sent out by Jesus Christ (Luke vi. 13). But the name seems not to have been confined to the twelve, for in 1 Cor. xv. Paul says of our Lord, 'He was seen of Cephas, then of the twelve, after that he was seen of James, then of all the apostles.' Evidently while the twelve were pre-eminent, others also were recognised as As., and even among the twelve there was a differentiation. 'The Pillars' stood out above the rest, and 'the Lord's brethren' were specially honoured. In Acts xiv. Paul and Barnabas are both spoken of as As., though neither of them belonged to the twelve. The title thus bestowed on many leading ambassadors of Christ was claimed by some who were not entitled to it (Itev. ii. 2). During the second century A.D. a traditional restriction grew up; after this we seldom find any but the original twelve, Matthias, and Paul entitled As., their chief followers being spoken of as 'evangelists' and 'apostolic missionaries.'

**Apostle Jug**, a form of stoneware vessel much used in the sixteenth and seventeenth centuries. It was made both with and without a lid, and was so called on account of its ornamentation with the figures of the 12 apostles in relief.

**Apostle Spoons**, frequent as christening presents during the fifteenth and sixteenth centuries. Each handle bears the figure of an apostle. A complete set of 12 spoons is now rare and commands a high price.

**Apostles**, Acts of the, *see* **ACTS**.

**Apostles' Creed**, *see* **CREED**.

**Apostles' Days**, the feasts of commemoration of the 12 apostles. In the Rom. Church these are: Matthew, Sept. 21; John, Dec. 27; Peter and Paul, June 29; Thomas, Dec. 21; Philip and James, May 1; Simon the Canaanite and Jude, Oct. 28; Bartholomew, Aug. 24; Andrew, Nov. 30; Matthias, Feb. 24; James the son of Zebedee, July 25. In the Gk. Church the following dates are different: Matthew, Nov. 16; John, Sept. 26; Thomas, Oct. 6; Philip and James, Oct. 9; Bartholomew, Aug. 25; Matthias, Aug. 9; James the son of Zebedee, Apr. 30.

**Apostles' Islands**, a group of 27 is. on Lake Superior, forming part of Wisconsin, U.S.A. Total area about 200 sq. m. The chief industries are lumbering and the quarrying of brown sandstone. Lapointe, on Madeline Is., is the chief tn., near which is an Indian reservation.

**Apostles, Teaching of the**, often called the Didaché (Gk. διδάχη, teaching), is the title of a Christian work of the apostolic age, discovered and pub. by Bryennios in 1833. It contains 16 chapters, and is divided into 2 parts,

the first of which gives an account of the 2 ways of life and death, and the second gives the rules governing the service, the sacraments, and the ministry in the church. It is believed that this work formed the basis of the *Apostolic Constitutions* dating from the third and fourth centuries. Certain passages in the *Didaché* and in the *Epistle of Barnabas* resemble each other, and it has been a point of contention as to which preceded the other; but some think that they are independent. Harnack, Taylor, and others believe that the first part of the *Didaché* was originally a Jewish work entitled *The Two Ways*. The exact date of the work is not known, as the dates assigned to it vary from the latter part of the first century A.D. to the middle of the second century.

**Apostolic Constitutions and Canons.** The A. C., in 8 books, is a collection of notes on the eccl'es, customs of the first 4 centuries. The work purports to be written by the apostles, but it is a composite work which has gradually crystallised, its composition extending over a long period of time. To the last book are appended the *Canons of the Holy Apostles*, said to have been given to the Church by Clement of Rome. Opinions as to their value have varied considerably, but out of the 85 canons, only 50 (trans. into Lat. by Dionysius the younger) have ever been commonly known in the W.

**Apostolic Fathers.** These hold an intermediate place between the apostles themselves and the apologists of a later period. The name should, strictly speaking, be given only to those believed to have been in actual touch with the original apostles, as Clement, Ignatius, and Polycarp, but by common usage it has come to include others who, during the second century, carried on the traditional teaching of the primitive Church, among whom were Irenæus and Hermas. Their writings are valuable for their differences as well as their essential likeness in spirit, for they show how the growing Church was influenced by both the personality and nationality of its great missionaries.

**Apostolic Majesty,** a title of the kings of Hungary conferred by Pope Sylvester II. upon St. Stephen, king of Hungary, in 1000. It was renewed by Pope Clement XIII. in 1758 in favour of Queen Maria Theresa, and was used by the late emperor of Austria.

**Apostolic Succession,** the doctrine that the power of ministering in the Christian and Catholic Church can be derived only from a validly consecrated bishop, i.e. one who had himself been validly consecrated, and so on back to the time of the apostles. Or, to look at the question from the other end, that the apostles received powers of ordination which they handed on to others, and which has so been handed on down to the present bishops of the Church. It is insisted on as of the case of the Church by the Rom. Catholic, Gk. Orthodox and Anglican Churches, but its necessity is denied by the various Protestant sects.

**Apostolici** were imitators of the apostolic life mentioned by Epiphanius (*Hæres.*, 67). In the middle of the twelfth century there existed a sect called Apostolic Brothers on the banks of the Lower Rhine, who rejected oaths, infant baptism, fasts, ceremonies, worship of saints, purgatory, masses, second marriages, and the power of the pope. Some of them were brought before the eccles. court of the archbishop of Cologne, and were afterwards burned to death. About 1260 Gerhard Segarelli of Parma founded another apostolic brotherhood who rejected the authority of the pope, oaths, and capital punishments.

**Apostolius, Michael** (d. c. 1480), a Gk. theologian and native of Constantinople. When the Turks conquered the city he fled to Italy, and so zealously upheld Plato's teaching as against that of Aristotle that he lost the protection of his patron Cardinal Bessarion, and retired to Crete. Among his numerous works were *Paramira*, a collection of proverbs in Gk., first printed in 1538; a fuller ed. was pub. in 1619, ed. by Heinsius. Another work was *Oratio Panegyrica ad Fredericum IV.*

**Apostrophe:** 1. A rhetorical figure of speech; literally a turning away (*ἀποστροφή*), when a speaker breaking off his discourse addresses himself directly to some person or object. 2. A comma (') denoting elision, as in c'er. In the genitive singular it represents the A.-S. ending *es*, as man's for *mannes*. The incorrect use of the (') is a very common error.

**Apothecary,** originally the keeper of a drug store (Lat. *apothecarius*), later a rival of the physician. Now called in England a pharmaceutical chemist.

**Apothecaries' Fluid Measure and Weight, see under WEIGHTS AND MEASURES.**

**Apothecia** (Gk. *ἀποθήκη*, storehouse) are open, shield-like fruits of certain fungi of the group *Discomycetes*, e.g. *Phyiscia parietina*. Here they may be seen attached to the surface of the leaf-shaped thallus, of a darker orange colour than the rest of the plant.

**Apotheosis,** deification, the recognising of a mortal as a god—this is very frequent in polytheistic religions. (See Proude's *Short Studies*, vol. III.) Julius Cæsar was deified by Augustus, and this precedent was followed by other Cæsars. Even their relatives and favourites were often thus honoured. Constantine was deified by the pagans, and canonised by the Christians. A modified form of A. exists in the Gk. and Lat. churches, but the worship accorded to saints (*ἅγιοι*) is formally distinguished from that offered to God (*θεοὶ*).

**Apotome:** 1. In anct. Gk. music, the remainder of a whole tone when diminished by a limma or smaller semitone, the ratios being 2187 and 2048. 2. In mathematics, the difference between 2 incommensurable numbers, or the difference between the diagonal and side of a square.

**Appalachian Mountains.** These mts. form an important feature in the physical

geography of the U.S.A., separating the plain of the Mississippi-Missouri from the Atlantic slope. Their total length, about 1500 m., extends from the St. Lawrence to Alabama, and their width in some parts reaches 300 m. They are longitudinally divided into a number of ranges and valleys, the latter forming a chain known as the Great Appalachian Valley. The chief ranges in the N. are the White Mts. and the Green Mts. (Vermont), with some smaller hills N. of the St. Lawrence; in the centre, the Blue Ridges of Pennsylvania and Virginia; in the S., the Black and the Smoky Mts. The highest of the N. peaks rise to 5000 or 6000 ft., many in the S. reach nearly 7000 ft. On the W. the Alleghany plateau slopes to the Central Plain. The E. ranges are pierced laterally by the Hudson, Delaware, and other valleys, but the W. plateau is almost unbroken. This had a notable effect on early colonisation; Eng. settlers, with great labour and hardship, worked their way along the rivers to the A. Valley, but there they were stayed for many years by the difficult country, and also by the enmity of the red men, encouraged by the Fr. from Canada and the Spaniards from Louisiana. This check helped to fill up and solidify the Atlantic states, and hardened them for their later contests with France and England.

The chief rivers of the A. system are the St. John (N. Brunswick), Hudson, Delaware, Susquehanna, Potomac, and James, on the E.; the Alabama flowing S., and the Tennessee, Cumberland, and Kenhawa into the Ohio. The ranges are largely covered with forests, and wild animals are numerous, including the bear, lynx, and deer.

**Appalachicola**, see APALACHICOLA.

**Appanage**, or **Apanage**, in Fr. law, was the provision of lands or feudal superiorities assigned by the kings of France for the maintenance of their younger sons, and was in practice from the time of the Capets until 1832. Towards the close of the thirteenth century the rights of the *apanagiste* were further circumscribed, and in 1790 it was enacted that the younger branches of the royal family of France should be provided for out of the civil list until they married or attained the age of 25, and that then a certain income called *rentes apanagées* was to be granted them. In 1832 the word A. was substituted for that of *dotation*. The term A. is now given to the allowance made to the princes of a reigning house out of the public funds. In Scotland A. is the patrimony of the prince and steward, and in England the duchy of Cornwall is the A. of the Prince of Wales.

**Apparatus Sculptoris**, or the **Sculptor's Workshop**, a constellation distinguished by Lacaille. It is situated in the reign of the heavens immediately to the eastward of the large star Fomalhaut or a Piscis Australis, and hardly rises above the horizon in our hemisphere. It is bounded by Cetus, Aquarius, Fornax Chemica, Piscis Australis, and Phoenix.

**Apparent** (in astronomy). An A. phenomenon is one which is actually seen in the opposition to that which results from correction or reduction.

**Apparent Magnitude**, in optics, the angle which any object subtends at the eye of an observer. If OB be the object, and E the situation of the observer's eye, then the A. M. of the former is the angle E—i.e. OEB, formed by two visual rays drawn from the centre of the pupil to the extremities of the object.

**Apparent Motion**, the velocity and direction in which a body appears to move, when the spectator himself is in motion, without being conscious of it.

**Apparition**, an immaterial appearance as of a real being; a spectre or ghost. From the earliest ages amongst all peoples a belief in As. was prevalent, and it only ceases to exist with a more enlightened knowledge of the circumstances which affect the minds of men. Amongst savages there is a belief that when a man is asleep his soul leaves his body and wanders in the night, and that the adventures which happen to the soul in its wanderings are real circumstances. The soul is supposed to visit friends, relations, or enemies, and these visitations are called dreams by the person visited. There is another belief among many people that when a man dies his spirit still lives and is seen by other people as a dream or a phantasm. In the early religions the worship of the dead played a great part, for sacrifices were made to members of the family who had died. The heathen had great fear of the spirits of the dead, which were regarded by him as demons. Against these demons he believed he had to struggle, and in order to succeed he embraced witchcraft. Closely allied to this belief in As. is the belief in ghosts, who were supposed to be the souls of deceased persons, appearing in a visible form, or otherwise manifesting their presence, to the living. The spirit of a murdered man is said to visit the murderer in the night. Ghosts have been alleged to appear in the same dress they wore when living; they are often pale and cloudy in appearance, and the ghosts seen in churchyards are often clothed in white. This belief in As. has had a very powerful influence on the mind of mankind. It has caused suffering and pain, and has often been the cause of the loss of the reasoning faculties; it preoccupied the mind; and the priest and the tyrant were powerful to delude the weak. There is no doubt that these delusions and superstitions were the outcome of ignorance, as may be proved by the investigations as to the causes of these physical and mental phenomena. It is well known that there are physical conditions which are necessary to sound thought, and a mind which is deranged by fear, by disease, or even by excitement, has a tendency to form images of those objects which have caused the derangement. Fear of a certain object has often caused that object to appear to the mind. As. have in all ages formed the subjects of pictures and of writings. The Society

for Psychical Research conducts investigations in this field. Amongst the works written on As. and kindred phenomena may be mentioned: R. Baxter, *Certainty of the World of Spirits*, 1691; S. Hibbert, *Sketches of the Philosophy of Apparitions*, 1824; C. Crowe, *Night Side of Nature*, 1852; Andrew Lang, *The Book of Dreams and Ghosts*, 1897; C. Richet, *Thirty Years of Psychical Research*, 1923; E. Bennett, *Apparitions and Haunted Houses: A Survey of Evidence*, 1939; H. Price, *The Most Haunted House in England*, 1940, and *The End of Borley Rectory*, 1946; and the publications of the Society for Psychical Research. See also HALLUCINATION; PSYCHICS.

**Apparitor**, in Rom. times, was a person who was in attendance on public functionaries to execute their orders (Livy, iii. 38). The term therefore included a great variety of officers (Justinian Code, 12, tit. 52, etc.). In later times an A. was a messenger in eccles. courts, whose duty it was to call defendants into court, and to execute the orders of the judge.

**Appeal**. In law, to remove a cause from an inferior to a superior court for the purpose of re-examination or for decision. In it the party appealing, called the appellant, tries to show that the decision of the lower court on a matter of fact or of law was erroneous, that the verdict was against the weight of evidence or the sentence excessive. By this means judicial abuses are reduced to a minimum and something approaching uniformity in judgment is secured by the fact that the judges or magistrates in the lower courts have the precedents and dicta of the higher courts to guide them. The party appealed against is called the respondent or appellee. The idea underlying the system of A. would appear to be that a principal does not divest himself of responsibility when delegating his authority to an agent. Judges being but the agents of the king, and through the king of the community, the responsibility for their decisions should, in grave cases at any rate, be brought home to its source. It is this idea which enabled St. Paul, brought before Festus, to say, 'I appeal to Cæsar' (Acts xxv.), and to have his A. allowed, and it is this idea which gives to every Brit. citizen the right of appealing in the last resource to the 'King in Parliament,' in other words, to the House of Lords. As. can be made from Dominion (excepting Eire), Indian, and colonial courts to the 'King in Council,' i.e., the Privy Council functioning through its judicial committee. In theory the entire House of Lords, or entire Privy Council, hears the A. In practice the House of Lords in its legal capacity consists of certain Law Lords whose functions are regulated by the Appellate Jurisdiction Acts, 1876 and 1887. The law lords consist of the lord chancellor, 4 lords of appeal in ordinary, and other peers of Parliament who hold or have held important judicial office, 3 forming a quorum. No peer is excluded, but by custom peers other than those mentioned neither attend nor vote. In the

case of *Bradlaugh v. Clarke*, in 1882, an eccentric and non-legal peer successfully asserted his right to sit and did so, voting with the minority. As. lie from the courts of A. in England, and from the court of session in Scotland, but there is no A. from the Scottish high court of judicatory. As. from the Eng. courts must be brought within 12 months. As. from the court of session must be brought within 2 years. Each of the lords may make a speech in the form of a judgment giving his views, and the decision is by majority. If their lordships should be equally divided in opinion the decision of the lower court stands and each side must pay its own costs. The law lords may sit independent of the fact that Parliament is prorogued or dissolved. The Privy Council's jurisdiction as an appellate court has been subjected to many modifying statutes, the Act which constituted its judicial committee being passed in 1833. This committee consists of the president of the council and the lord keeper and other councillors who hold or have held high judicial rank in the colonies or at home. Two other privy councillors may be added by the king and assessors in the persons of colonial judges, and in eccles. cases, of which the Privy Council is the final arbiter, bishops are sometimes added. The court of A. in England as constituted by the Judicature Acts, 1873-75, consists of the lord chancellor, ex-lord chancellor, the lord chief justice, the master of the rolls, the president of the Probate Div., and 5 lord justices. The quorum is 3, unless both parties agree to have the case tried by 2, and no judge may hear in the A. court an A. against his decision in the lower court. The court of A. has 2 divs.: the master of the rolls presides in one, and a senior lord justice in the second. If possible, King's Bench cases are heard by 2 common law and one equity (Chancery) justice, and in Chancery cases the proportions are reversed. The court must hear motions for a new trial or to set aside verdicts given by a jury. As. are heard from both divs. of the high court, from the palatine courts of Lancaster and Durham, the Liverpool court of passage, bankruptcy, etc., and the question of registration and parl. election petitions under the Corrupt Practices Act. Appeals from recorders' and magistrates' courts are heard in the first instance by the high court, and any further A. from that court would go to the Court of A. and from there to the House of Lords. The A. court may, but in practice seldom does, hear fresh evidence on A. and it may reverse the findings of the lower court, but may content itself with ordering a new trial. In interlocutory matters appeal must be made within 14 days, in final cases within 6 weeks, of judgment. As. in eccles. cases are heard by the Judicial Committee of the Privy Council. Until the Criminal Appeal Act, 1907, the practice of the criminal law in this country was almost unique in the fact that no A. was

allowed from the assizes (other than on a question of law reserved by the trial judge for the opinion of the old court for crown cases reserved (*q.v.*)), though clemency might be exercised by the sovereign on the advice of the home secretary. While, of course, the royal prerogative of mercy remains, the court of criminal A. (England), with carefully defined and somewhat restricted jurisdiction, offers to the convicted criminal another chance. The court consists of the lord chief justice and 8 judges of the King's Bench Div. appointed by him in consultation with the lord chancellor. They do not, of course, all sit at the same time, but there must be not less than 3 and always an uneven number of judges. An A. lies to the court on any ground which involves a question of law alone, but it is only by leave of the court or upon the certificate of the trial judge that an A. lies on any ground involving a question of fact alone, or mixed law and fact. There is also a right of A., by leave of the court, against sentence. In a few specified cases there is a further A. to the House of Lords. What are known as divisional courts, that is, courts consisting of 2 high court judges, hear nearly all the As. from quarter sessions and country courts, but the consent of the inferior court must in some cases first be obtained. Similarly, the consent of the divisional court is necessary before an A. from it to the A. court can be heard. The quarter sessions hear As. from courts of summary jurisdiction (police courts) when sentences of imprisonment have been imposed 'without the option.' In the Scottish courts there is an A. from the outer to the inner house of the court of session; from the sheriff court to the court of session, when more than £50 is involved; from the sheriff-substitute to the sheriff-principal; to the high court of judicatory, on points of law; from inferior courts in criminal cases; and to the quarter sessions from the petty sessions. For A. in the old criminal law of England involving trial by combat, see article under that head.

**Appeals in U.S.A.** Appellate jurisdiction in the U.S.A. may be considered under (1) A. from state courts to federal courts; (2) A. to the circuit courts of appeal; (3) A. to the Federal Supreme Court, and (4) injury cases. (1) *A. from State to Federal Courts.*—Such A. are authorised by statute where the construction of the Constitution, laws or treaties of the U.S.A. is involved, or some right, privilege, or immunity is claimed thereunder. Such an appeal can only be taken after the unsuccessful party has carried the case through the state courts to the court of last resort and is still unsuccessful. (2) *A. to the Circuit Courts of Appeal.*—The dist. courts and circuit courts exercise only original and not appellate jurisdiction. The courts of these 2 classes, together with the Supreme Court, formed the judicial dept. of the Federal Gov. until the year 1891. In that year a new court was created, called the circuit court of appeal, to be held at one or more places in each circuit, presided over by the 3 judges

authorised to hold the circuit courts throughout the circuit, or, in other words, the justice of the Supreme Court assigned to the circuit and the 2 circuit judges appointed for the circuit. By Acts in Congress the number of circuit judges of many cases has been increased to 3. In practice, however, the justices of the Supreme Court only in rare instances serve in this capacity. When the circuit courts of appeal were estab., the appellate jurisdiction of the circuit courts was transferred to them, and they were given also a considerable part of the appellate jurisdiction previously exercised by the Supreme Court, the object of establishing the circuit courts of appeal being to relieve the Supreme Court of too great a burden. The circuit courts of appeal in the exercise of their general jurisdiction hear appeal cases from the dist. and circuit courts in suits between citizens of different states or between citizens of a state and aliens; also in Admiralty cases and cases under the patent copyright revenue or postal laws, and in criminal cases where the crime is not capital or otherwise infamous, in which event the appeals lie to the Supreme Court. With but few exceptions the decision of a circuit court of appeal is final and conclusive, and no further appeal to the Supreme Court is allowed. These courts do not hear A. from state courts. (3) *A. to the Federal Supreme Court.*—The appellate jurisdiction of the Supreme Court embraces (i) A. from the dist. or circuit courts in convictions for a capital or otherwise infamous crime; in prize cases; in cases involving the construction or application of the Amer. Constitution and cases in which the constitutionality of any law of the U.S.A. or the validity or construction of a treaty made under its authority is in question; and in cases in which the constitution or a law of a state is claimed to be in contravention of the Amer. Constitution; (ii) A. from the circuit courts of appeal in any case certified by that court to the Supreme Court or removed from it to the Supreme Court by direction of the latter, and in some other cases in which A. to the circuit courts of appeal are not final; (iii) A. from state courts of last resort, but only in cases involving a federal question. Such is the case when there is involved (a) the validity of a treaty or statute of the U.S.A., (b) the repugnancy of a state statute to the Federal Constitution, or (c) where the decision is against any title, right, privilege or immunity claimed to be under the Constitution, statutes, treaties, or authority of the U.S.A.; (iv) A. from the Supreme Court of the Dist. of Columbia or the Supreme Courts of the ters.; (v) A. from the court of claims or from dist. or circuit courts in cases against the U.S.A. (4) *A. in Jury Cases.*—The Constitution provides that 'no fact tried by jury be otherwise re-examined in any court of the U.S.A. than according to the rules of the common law.' But this article merely prohibits a review by a court sitting without a jury of the conclusions of fact reached by a jury and there is an appellate



jurisdiction in jury cases which allows the court to review the rulings of the trial judge and to reverse the decision of the judge entered on the verdict for errors of law.

Congress passed an Act in 1916 to give finally to the decisions of state courts and circuit courts of appeal in certain types of litigation, leaving to a discretionary review by the Supreme Court the question whether a national interest might be involved. This Act has diminished the number of cases of writs of error to state courts, but appears to have had very little effect on A. from the courts of error to the circuit courts of appeal. After the Act had begun to make itself felt in reducing the cases on error to the state courts, the most prolific source of the courts' business was the direct review of dist. court decisions. An Act was passed in 1925 by which it was hoped to assemble in a single statute the whole law defining the appeal power of the U.S. courts and to gather up the scattered provisions defining the jurisdiction of the circuit courts of appeal. The aim of the Supreme Court is to be allowed to confine its adjudications to issues of constitutionality and other matters of essentially national importance. It is open to doubt whether the Act has achieved this purpose to any appreciable extent, but in theory cases now come to Washington only from 3 sources: the dist. court, the circuit court of appeal, and the state court. A decision adverse to the constitutionality of Federal legislation cannot be taken from the circuit court of appeal except on *certiorari* (q.v.); but a declaration by the circuit court of appeal of the unconstitutionality of state legislation is subject to review as of right by the Supreme Court. See Felix Frankfurter and James M. Landis, *The Business of the Supreme Court: a Study in the Federal Judicial System*, 1928.

**Appearance.** In law, within 8 days from the service of a writ or summons, the defendant must 'enter an A.' by delivering to the proper officer of the court a memorandum stating his intention either to defend the case himself or to employ a solicitor on his behalf. Notice of this is given to the plaintiff. This procedure obviates the need of a personal A. In civil cases special provision is made for the representation of infants, lunatics, companies, etc., by responsible persons.

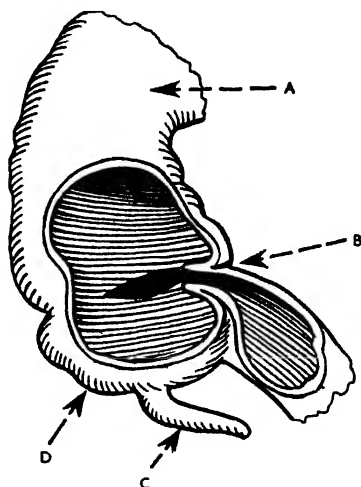
**Appellants, or Lords Appellant,** the title given to Thomas, duke of Gloucester, and the earls of Derby, Arundel, Nottingham, and Warwick, who in 1387-1388 'appealed,' i.e. accused of treason, De Vere and De la Pole, the advisers of Richard II. during his minority. The L. A. were responsible for the actions of the 'Merciless Parliament' of 1388. In 1397 Richard imprisoned Warwick and Gloucester, and caused Arundel to be executed.

**Appendant,** a legal term applied to incorporeal hereditaments. Thus advowsons may be A. to a manor; lands to an office; and various rights, as of

fishing, to a freehold. As., as being originally annexed to the prin., are distinguished from appurtenances, which may be created by grant or prescription at any time.

**Appendicitis,** see APPENDIX.

**Appendiculariidae** (Lat. *appendix*, from *appendere*, to hang from), family of Ascidians belonging to the phylum Tunicata, including sev. genera, notably the Appendicularia, Oikopleura, Fritillaria, and Kowalevskia. They have an oar-shaped tail which contains a persistent notochord, and they have 2 gill-apertures. Huxley destroyed the fallacy that they were larvæ.



APPENDIX

A, large intestine; B, entry of small intestine (showing valve) into D, caecum; C, appendix.

**Appendix,** in anatomy, an appendage; the term is applied particularly to the A. vermiformis, the small blind gut projecting from the caecum. The average length of the A. is  $4\frac{1}{2}$  in., and the diameter about a quarter of an inch. The size, however, varies greatly, and cases have been recorded of the congenital absence of the A. It has no known function in the human body, and probably represents an organ which is gradually being evolved out of existence. Hence its vitality is low, and it is peculiarly susceptible to the inflammation known as appendicitis.

**Appendicitis** is favoured by any structural defects of the organ, such as unnatural length, location, and arrangement. The presence of faecal concretions and foreign bodies, such as seeds, gall-stones, bristles, worms, etc., acts as a predisposing cause; and intestinal disturbances, caused by indiscretions in the diet, may bring about

an attack. Females are less often attacked than men, because there is often a lymphatic connection between the A. and the right ovary, so that it is not so completely shut off. The onset may be gradual, but frequently is quite sudden. There are abdominal pain, fever, and constant tenderness on pressure over a limited area midway in a line between the anterior superior iliac spine and the umbilicus.

Surgical treatment is of great importance. Although all cases do not demand operation, a surgeon should always be at hand to help to settle the important question of when the operation should be performed. At the beginning of an attack is the safest time, but if abscesses are being formed before the condition is recognised, it is wiser to wait until adhesions have been formed. The death-rate from appendicitis has of late been enormously reduced by prompt surgical interference. The period of convalescence demands great care in the management of diet and bowel action, and no exercise of any kind should be undertaken for some time.

**Appenzell**, a canton of N.E. Switzerland, enclosed within the canton of St. Gall. It is divided into Ausser Rhoden, mainly Protestant and industrial, and Inner Rhoden, Rom. Catholic and pastoral. A remarkable feature of A. is the yearly *Landesgemeinde*, or general assembly, held in each Rhoden, at which every adult male citizen *must* appear, girt with a sword. Here the local gov. and the representatives to the Swiss Federal Assembly are elected. From the eleventh to the fourteenth century A. was under the abbots of St. Gall, but after a hard struggle for independence it became a member of the Swiss confederation in 1522. Its old code of laws (the Silver Book) is still used in swearing in the executive at the *Landesgemeinde* in Inner Rhoden. Ausser Rhoden (pop. 55,000, chief tn. Herisau (13,000) manufs. cotton, muslin, and embroidery. Inner Rhoden (pop. 14,500, cap. A. pop. 3000) is especially conservative in the retention of old-world dress and traditions.

**Apperception**, a metaphysical term first introduced by Leibnitz (1646-1716), to denote the spontaneous transformation by the mind of the 'perceptions' of sense into the elements of conscious knowledge. This idea was taken up by Kant (1724-1804), who laid special stress upon the spontaneity of the mental action involved, and introduced the theory of the 'synthetic unity of A.', i.e., the principle that all incomplete knowledge must be capable of falling into place in one complete system. The psychological side of A. has been worked out by Herbart (1776-1841), Lazarus (1824-1903), and Steinthal (1823-99), who emphasise the practical significance of the process, and make the realisation of this the basis of educational theory. The subject has received still further attention from Wundt and Stout. See G. W. von Leibnitz, *Nouveaux*

*Essais*, 1765; J. F. Herbart, *Psychologie als Wissenschaft*, 1824-25; G. F. Stout, *Analytical Psychology*, 1896; W. Wundt, *Principles of Physiological Psychology*, trans. 1904.

**Apperley**, Charles James, better known as 'Nimrod,' under which pseudonym he wrote many articles for the *Sporting Magazine* and the *Quarterly Review*, besides sev. books on sporting matters, including the famous *Life of John Mytton*, 1837. He was an enthusiastic fox-hunter, and his books take high rank in the literature of sport. He d. in London, 1843.

**Appiani, Andrea, the Elder** (1754-1817), a famous fresco painter of Milan. He modelled himself on Correggio, and is thought in his frescoes 'Amor and Psyche' at Monza, and others in the royal palace at Milan, to have almost equalled his master. His prosperity ended with that of his great patron, Napoleon I.

**Appiani, Francesco** (1702-92), a distinguished fresco painter of the eighteenth century, was b. at Ancona. He was employed by Benedict XIII. at Rome, but he lived chiefly at Perugia, where he continued to paint until his death. He shows a degree of vigour, except in the cases of Spinello Aretino and Titian, perhaps without a parallel. He painted, according to Lanzi, many pictures for Eng. commissions.

**Appiano** was the name of an It. family in the Middle Ages. Jacopo d'A. was secretary to Pietro Gambacorta, who made him chancellor of Pisa. He killed Gambacorta and his 2 sons 1392, and acquired Pisa, which was retained until his son sold it to the Duke Visconti of Milan about 1400. Piombino, however, was retained by the family until 1589, when Alessandro, the last possessor, was killed, and it fell into the hands of Spain.

**Appianus** (c. A.D. 90-140), an important Rom. historian, b. in the first century A.D. A native of Alexandria, he there attained high office, but about A.D. 100 removed to Rome. Here he practised as a lawyer, and also occupied himself in composing a series of chronicles of the growth of the Rom. empire, taking the chief dists. and periods separately. His 24 vols., 11 of which are extant, were merely compilations, and are not made attractive by eloquence or any great power of thought. Yet writing as he does on the hist. of those periods, especially of the civil wars, of which there are few memorials remaining, his records are of great value. His works have been ed. by sev. modern authorities, notably in Ger. by Schweighäuser, Bekker, and Mendelssohn, and an Eng. translation is pub. in Bohn's Classical Library.

**Appia Via**, a Rom. military road, begun about 312 B.C. by Appius Claudius, to consolidate the conquest of Samnium. Appianus illegally prolonged his censorship that he might complete this work and his famous aqueduct. He carried the former from Rome to Capua, and the skill with which it is taken through difficult country, over

hills, ravines, and marshes, is remarkable. It was continued later to Beneventum and Brundisium, and so solidly was it constructed that much of the old work remains to this day. Statius calls it 'longarum regina viarum.' For miles out of Rome it is bordered by pagan and early Christian ruins. Horace, in his first satire, describes a journey along it, and St. Paul came this way into Rome (Acts xxviii. 15). Trajan varied its final stage by a new route, the Via Traiana, from Beneventum by Canusium, and Pius VI. in 1789 constructed the New Appian Way from Rome to Albano.

**Appin**, a dist. of Argyllshire, in 'the Stuart country' between Loch Linnhe and Loch Creran, with rugged but beautiful scenery. Slate, granite, and lead are worked. Principal vills., Ballachulish, Duror, and A. This dist. plays an important part in Stevenson's *Klannapped*.

**Appius Claudius**, see **CLAUDIUS**.

**Apple**, a spurious fruit, or pseudocarp, of the species *Pyrus malus* of the Rosaceæ. It has been cultivated for many ages and in many lands; Homer speaks of its presence in the gardens of Alcinous and Laertes, while, according to the phrase of Horace, a Roman banquet lasted 'ab ovis usque ad mala,' from the egg to the A. It is a spurious fruit because the calyx-tube swells up to form the fleshy part. The *pips* are the seeds, and the pseudocarp is called a *pome*.

**Apple, Love**, see **TOMATO**.

**Apple of Sodom, or Dead Sea Apple**, the fruit of a tree said to grow on the shores of the Dead Sea. The legend avers that it looks like a tempting fruit, but when plucked is found full of ashes. Thus 'like an apple of Sodom' has come to signify disillusion.

**Appleberry**, see **BILLARDIERA**.

**Appleby**, a bor. and mkt. tn., cap. of Westmorland, on the R. Eden. It was an important stronghold in the Norman period, and suffered so much from attacks by the Scots in 1176 and 1388 that it never regained its former status. During the great rebellion it was held for the king by Anne, countess of Pembroke. It returned 2 members to Parliament until 1832, when it was disfranchised. Pop. 1600.

**Appleton**, co. seat of Outagamie co., Wisconsin, U.S.A., on the Fox Riv., about 90 m. N. of Milwaukee. First settled in 1833. Has a famous univ. founded by Amos Laurence in 1847, also large manufs. of paper, machinery, woollen goods, etc. It became a city in 1857. Pop. 28,000.

**Appleton, Sir Edward V.** (b. 1892), Brit. physicist, b. at Bradford, Yorkshire, educated at the Cavendish Laboratory, Cambridge. Devoted himself to research on radio-waves, and has become the world's leading authority on them. Secretary of the Dept. of Scientific and Industrial Research, thus occupying the senior Brit. Gov. post concerned with physical science. In 1924, to-

gether with S. J. Barnett, A. devised and made the experiment which proved the existence of the Kennelly-Heaviside reflecting layer in the upper atmosphere. They located the position of this layer in the upper atmosphere by radio-waves. The experiment was, therefore, the first example of the location of an object by radio waves—or, in other words, by radio-location. The technique was subsequently used for the location of aircraft. In further experiments A. in 1926 showed that there was an additional reflecting layer at a height of 150 m. above the ground, which was electrically stronger than the Kennelly-Heaviside layer, and was the reflecting agent which enabled short radio waves to pass round the world. Hence, the fact that we can broadcast round the world is due to this experiment. Has pub. various original papers on electricity and the scientific problems of wireless telegraphy.

**Appoggiatura** (It. *appoggiare*, to lean on), a short musical note used as an embellishment, and having no time-value. The time of the long A. is taken from the note which follows it; it is given its marked value, and the succeeding note takes what remains of its face value. It originated in the desire of classical composers, such as Beethoven, to hide a suspended note, and is now obsolete. The short A. is known also as an *acciacatura* (q.v.) or grace-note, and is written with an oblique stroke through the stem.

**Appointment, Power of**, see **POWER**.

**Appomattox Courthouse**, a vil. in A. co., Virginia, where the Confederate army under Lee surrendered to the Federals under Grant on Sunday, Apr. 9, 1865, and ended the Civil war.

**Apponyi, Count Albert** (1848–1933), Hungarian statesman and the 'Grand Old Man of Hungary.' Originally leader of the Nationalist party (Conservative), but in 1899 went over to Liberals. Leader of the Independent Kossuth party, which opposed the Hapsburg dynasty. In 1901 became president of the chamber of deputies, but resigned from the Liberals in 1903 and again led the National party. In 1906 as minister of education his work had a profound effect on Hungarian culture. After the Communist revolution he was commissioned by the Entente to form a gov. in Hungary, but failed to secure agreement between the different parties. Was chairman of the Hungarian peace delegation. Was awarded Grotius prize of The Hague Univ. together with Earl Balfour. See *The Memoirs of Count Apponyi*, 1935.

**Apportionment**, signifies generally a sharing in due proportion, as in the allocation of benefits, damages, liabilities, etc. In law the regulations concerning A. are so numerous and complicated that special Acts to systematise them have repeatedly been passed in Great Britain, the colonies, and the U.S.A. They fall under 2 main heads: (1) A. in respect to estate; (2) A. in respect to time. Property bequeathed on trust

under certain conditions is governed by what is called *equilable A.*

A. Bills are passed in the U.S.A., one after every census, to determine the ratio of representation for each state in the coming decade; the states themselves also make similar regulations for their own legislatures. This system has often been greatly abused for party purposes.

**Apposition.** In grammar, when a noun or noun-clause is used to explain a noun or pronoun in the same case, they are said to be in A.; thus 'John the Baptist was beheaded,' 'He, the chief culprit, escaped.' Here 'the Baptist' and 'the chief culprit' are nominatives in A. to 'John' and 'he' respectively. Again, 'Alexander killed Clitus, his friend'; here 'friend' is objective in A. to 'Clitus.' In the possessive case the apostrophe is added to the second noun, as 'William the Conqueror's army.'

**Appraisement,** a legal term meaning valuation, such as may be required for purposes of sale, distress, mortgage, assessment, compensation, or probate. Any person undertaking the work, unless he is a licensed auctioneer or house agent, must take out an appraiser's licence, the penalty for default being £50. He is liable to the person employing him for any loss arising through negligence or want of skill on his part.

**Apprehension,** in psychology, a term which serves to point the distinction between the act of thinking and the object of the thought. A complete object can only be adequately described in language, and not by isolated words, or, in other words, only by propositions capable of being asserted, denied, or assumed. If, for instance, the thought takes the form of believing, it is clear that we cannot 'believe' the object as such, but we must believe some proposition concerning that object. Again, when we are said to 'perceive' or 'know' something, this expresses the fact that we perceive or know that something is or is not the case. From this it is evident that the object of thought holds an identity in our consciousness which is independent of both time and change. It retains its identity of meaning. Events begin and cease; but what the mind *apprehends* is not the mere event as it occurs, but the 'fact' that it does occur. Thus, the Great Fire of London began and ended in 1666, but the fact of its occurrence in that year is not limited by temporal conditions; that it happened in that year is a *fact at the present moment*. In the language of psychology, the distinction is between the act of thinking, which is an event in our own mental hist., and the object which has the same meaning whenever it is apprehended. The acts of thinking and apprehending are distinct occurrences in the time-order of our conscious life. I can apprehend the Great Fire repeatedly on different occasions; but on each separate occasion my perception is a separate one. As a corollary of this position,

it is evident that the object itself can never be identified with the present modifications of the individual consciousness by which it is 'cognised.' Again, there is said to be 'implicit A.' when anything is apprehended in the act of apprehending a whole of which it forms a part, without being separately distinguished as a constituent of this whole. Thus, in glancing at a clock, I am distinctly conscious of the clock face as a whole, but not separately of the shape of each individual numeral which it contains; or again, in listening to a band, I may clearly apprehend the combined sound as a confused mass without differentiating the several tones produced by the various instruments. Such implicit awareness is called by psychologists subconsciously as distinguished from clear consciousness. Psychology also deals with this distinction in the consideration of the organism and forms of 'attention' or the range and scope of attention or of momentary consciousness. Consult James Rowland Angell, *Psychology*, 1905; G. F. Stout, *A Manual of Psychology*, 4th edition, 1929.

**Apprentice,** one who is contracted to a master for a certain period to be taught a trade or profession; in return he gives his services, and usually a premium is paid. The system can be traced back to the thirteenth century, when it applied to all trades and professions, even students being indentured to study for their degrees. Barristers were technically As. for 16 years, but for most arts and crafts the term was 7 years, which period was made universal and compulsory early in the reign of Elizabeth. Difficulties and anomalies arising later led many persons to question the value of this arrangement, and after much argument, in which Adam Smith in his *Wealth of Nations* took a leading part, Parliament decreed in 1814 that trades and handicrafts should be thrown open to non-As. also. Of late years, owing to many causes, such as parents' difficulties in paying premiums, the increased subdivision of labour, trade union restrictions, etc., the number of apprenticeships has so decreased as seriously to affect the supply of thoroughly trained workmen. Efforts have been made by various public bodies to remedy this, with only partial success.

An A. being generally a minor, the contract is signed on his behalf by a parent or guardian. It must always be stamped, except in the cases of parish and ships' As. A master has considerable authority over a lad during his period of service, but the tyranny and ill-treatment which were common in olden times are now unknown. The A. must work on any day his master requires, except Sunday, and must not enter upon any engagement which might interfere with his duties, without the employer's consent. Obedience and good conduct are imperative, but corporal punishment for

misbehaviour has become obsolete. The master must supply proper training and indoor As. must be provided with food and medical attendance. He cannot discharge an A. without grave cause, such as serious misconduct or permanent disablement. The agreement is at an end if the master dies or becomes bankrupt, and it may be concluded by mutual consent.

**Approaches**, in warfare, trenches dug by besiegers to protect them in gradually working their way nearer to the line of fortification. Introduced into Europe by the Turks in the fifteenth century.

**Approbate and reprobate**, a Scottish theological term corresponding to the Eng. 'doctrine of election.'

**Appropriation** (from Lat. *appropriare*) means the setting aside of money or other property to be applied exclusively for one particular use. In Eng. eccles. law, the existing system of impropriation is the result of the changes made during the reign of Henry VIII., when at the dissolution of the monasteries many of the lands which had belonged to the Church were granted by the king to his courtiers and others. These estates often included rich benefices, whose principal tithes had been appropriated to the use of a monastery or bishopric, while a vicar or curate had been appointed to take charge of the par. duties. The new owners continued the custom, and those of them who were laymen came to be called lay impropriators, or lay rectors.

In civil law, a debtor who owes separate amounts to the same creditor is entitled when making a payment on account to allocate the money as he likes in respect of the different debts. If he pays it in without making any such stipulation the creditor can appropriate it as he chooses, even to the payment of a debt which has been allowed to lapse. If there has been no selection by either, the law generally gives the preference to earlier rather than later debts.

In constitutional finance, both in Parliament and, in the U.S.A., Congress, special Appropriation Acts are passed every session to authorise payments by the Treasury of various sums required for the public service, as set forth in estimates presented to and passed by the House.

**Approved School**. Before the passing of the Children and Young Persons Act, 1933, A. Ss., or 'Home Office schools,' as they are sometimes called, were known as industrial schools and reformatories. The expression 'Home Office school' is misleading, because it suggests that they are entirely run by the Home Office, whereas, in fact, out of a total of 95 such schools which were certified in 1939, 72 were under voluntary management, and the remaining 23 were provided by local authorities. But none of them may operate except subject to Home Office inspection and approval, though the Home Office has no control over the appointment of the staff apart from the headmaster or headmistress. The cost of maintaining a

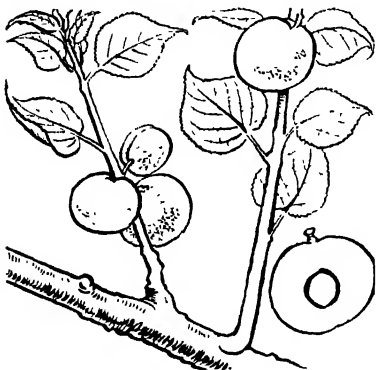
child in an A. S. is borne equally by the Exchequer and by the local authority within whose dist. the child was resident when his (or her) offence was committed, or the circumstances arose which led to his committal. But the child's parents or guardian may be required to contribute according to their means. The schools are classified according to age-groups: Boys' schools: junior (for boys under 13 on admission); intermediate (boys of 13 and under 15 on admission); and senior (boys of 15 and under 17). Girls' schools: junior (girls under 15 on admission), and senior (for girls of 15 and under 17 on admission). Each of the classes contains Rom. Catholic schools, and there is a subsidiary classification of the senior schools according to the specialised forms of technical training they provide. Thus among the boys' schools there were, in 1939, 4 nautical schools, besides schools equipped for instruction in engineering, agriculture, gardening, and other trades. Most of the girls' schools teach domestic subjects, but a few specialise also in gardening too. In the junior schools the education provided is on the same lines as in the public elementary schools. A child or young person may be committed by the court to an A. S. in any of the following circumstances: (i) on a finding of guilt for any offence punishable in the case of an adult with imprisonment; (ii) on the application, and subject to the consent of, his parent or guardian, and of the local authority, if he is found by the court to be 'beyond control'; (iii) on the application of a public assistance authority, if he is maintained in, or boarded out from, an institution belonging to the authority and he is found to be refractory; (iv) on the application of the local education authority if the court finds that a school attendance order has not been complied with; and (v) if a child or young person is found by the court to be 'in need of care or protection.' Once the court has decided to commit a child or young person to an A. S., it is the duty of the local authority to make inquiry and to supply the court with information as to a suitable school in which there is a vacancy. But the selection of the school rests with the court, limited of course by the age of the child and his religious persuasion. Under present conditions the schools are so full that a local authority is fortunate if it succeeds in finding a vacancy in any school of the right age-group within a month or two of committal. At the end of 1941 there were no fewer than 1300 children, all committed to A. Ss., waiting their turn in remand homes in different parts of the country. Sometimes several months elapse between the date of committal and the child's arrival in the school, during which time he has to be detained in a type of institution which was never designed for long-term treatment. At the moment (1942) the Home Office is planning to relieve the congestion in the remand homes by the opening of sev. new A. Ss., and, in particular, by the erection of 4 new institutions, designed on the lines of permanent camps, each with a capacity

of 250 children. In recent years the experiment has been tried of providing a few short-term A. Ss. to which the court may send cases which do not appear to require the full training which the ordinary school provides.

Consult *The Child and the Magistrate*, by John A. F. Watson (chairman of the Southwark Juvenile Court), 1942.

**Approved Society.** 1. A friendly society approved by law for the purposes of the National Health Insurance Acts prior to that of 1946. See NATIONAL INSURANCE.

2. A society registered under the Industrial and Provident Societies Acts (1893-1923), or the Friendly Societies Acts (1896-1924), one of whose chief



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objects is the provision of allotments, and which is restricted by its constitution as to the rate of interest on its share and loan capital and the distribution of profits among its members.

3. A registered company the constitution of which prohibits the issue of any share or loan capital with interest or dividend exceeding the rate laid down by Treasury regulations.

**Approver.** By the old Eng. law, when a person who had been arrested, imprisoned, and indicted for treason or felony confessed the crime charged in the indictment, and was admitted by the court to reveal on oath the accomplices of his guilt, he was called an A.

**Approximation,** a term used in mathematics to denote a result which is not exact, but sufficiently accurate for the purpose for which it is required. Where calculations depend on measures of length, weight, etc., the measurements themselves, even with the best of instruments, are only approximate, so that it is useless to elaborate the calculations to a degree of refinement exceeding the efficiency of the instruments. Where money calculations are involved, it is usually unnecessary to carry them further than the limits of the coinage; for instance, interest calcula-

tions do not generally include fractions of a penny.

A. may be procured by limiting the number of places of decimals, or the number of significant figures, or by expressing the result as correct within a certain fraction of error of the whole. In pure mathematics, logarithms and trigonometrical constants are usually only correct to a certain number of places of decimals.

**Apraxin, Feodor** (1671-1728), a distinguished Russian soldier and admiral under Peter the Great, whom he greatly assisted in founding the Russian navy. He took a leading part in the wars against Sweden and Turkey, and was made senator and admiral-general. Brave, genial, capable, and energetic, he was yet greedy and dishonest, and incurred Peter's wrath to such an extent that he would have been beheaded but for the intervention of the Empress Catherine, whom later he helped to place on the throne at Peter's death.

**Apricot,** a well-known fruit, a drupe, of the *Prunus Armeniaca*, a species of Rosaceae. It is related to the cherry, almond, peach, and plum, and is largely cultivated in Europe.

**Apries,** an Egyptian king, the son of Psammis (Psamthek), and eighth king of the twenty-sixth dynasty (Eusebius), or the seventh, according to Africanus. In Heb. hist. he is known as Pharaoh Hophra (Jer. xlv. 30). He succeeded his father in 589 B.C. and reigned 25 years. He made an expedition against Cyprus, and fought a naval battle with the king of Tyre. His army sent against the Gks. of Cyrene was defeated, and this circumstance caused a revolt of the people under Amasis, whom they asked to be king. A. was defeated and executed 568 B.C. and was buried in his ancestral tomb at Sais. See Herodotus, II. 161-163 and 169; iv. 159.

**April,** the fourth month of the year, consists of 30 days, which was the number said to be assigned to it by Romulus. Numa Pompilius gave it 29; but Julius Caesar gave it 30, which number it has since retained. In the original Alban or Lat. calendar A. consisted of 36 days and was the first month. The Rom. name was Aprilis, from *aperire*, to open; either from the opening of the buds, or of the bosom of the earth in producing vegetation. The A.-S. name was *Eostre-* or *Eastre-monath*.

**A priori** and **A posteriori.** The contrast between these 2 methods of reasoning does not now imply exactly what it did in anct. times. By an *a priori* argument was originally meant one from law or cause to effect, by a *posteriori* one from effect to cause. Kant, the great Ger. philosopher, introduced a new distinction. Reasoning on the fundamental laws of the mind, he asserts that there are certain 'transcendental ideas' (called by him *categories*), which exist independently of experience, and arguments from these are *a priori*. Such ideas are those of space, time, reality, negation, and

others, which, he says, we do not derive from experience, but through the application of which we acquire experience. In morality also he declares that the ideas implied in the words good and bad are innate and imperative in every mind, independently of actual observation. *A posteriori* arguments, on the other hand, are deduced from experience founded on observation. That school of philosophy which sets the highest value on the Kantian *a priori* reasoning is called Institutionalism or Transcendental; the opposing section are called Empiricists.

**Apron.** The original meaning of a protective outer garment has been extended to cover various engineering devices used to shelter certain parts of a mechanism. Thus it is used of a rectangular piece of lead which covered the vents of cannon; of a piece of curved timber above the forward end of the keel of a ship; of a protective platform at the base of machines, etc.

**Apsaras** in Hindu mythology, a race of female water-sprites, somewhat resembling the Germanic swan-maidens, who appear in the Gandharvas legends.

**Apsæ**, a semicircular or polygonal termination to or prolongation of a church or other building, more common on the Continent than in England. Besides the A. at the E. (or W.) end, others have sometimes been added, for example, at the ends of transepts. As. are frequent in Byzantine and Coptic churches, and in anc. Rom. buildings.

**Apscheron** is a peninsula in the Caspian Sea at the end of the Caucasus Mts. The seaport of Baku (*q.v.*) is situated here, and the dist. has a very large petroleum industry.

**Apsides.** All heavenly bodies, except free-wandering comets, move round their primaries in an elliptical orbit, and the 2 points in that orbit which are at the greatest and least distance from the central body are known as A. The point most distant is called the higher apsis or aphelion, that least distant the lower apsis or perihelion (the corresponding terms in relation to the moon are apogee and perigee). The line of A.'s is the major axis of the ellipse. This line, which, owing to the attraction of other bodies, is always shifting forward (in the case of the earth and all the planets except Venus, where the motion is retrograde), gives rise to what is known as the anomalistic year, i.e. it takes the earth 4 min. 39 sec. longer than the sidereal year to return to its perihelion.

**Apsley House**, a mansion standing by Hyde Park, London. It was built by Baron A. Lord Bathurst, in 1785, and in 1820 Wellington bought the lease from his brother, after living in it from 1816, and in 1830 he bought the Crown interest. It is now the property of the nation.

**Apsyrtus**, see ABSYRTUS.

**Apt** (anc. *Apta Julia*), a Fr. tn. in the dept. of Vaucluse, 30 m. S. of Avignon. The cathedral was built about the tenth century. Pop. 6000.

**Apertal** (Gk. a privative, and *πτερόν*

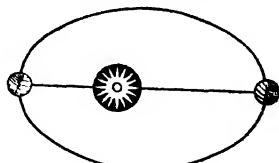
wing), an architectural term applied to a temple which has prostyle, but whose columns do not extend laterally and run along the flanks from one end to the other. Few Gk. temples followed this fashion but most of the Rom. parallelogrammic temples were apertal prostyle.

**Apterygota**, or **Aptera**, are insects which are themselves wingless, and are thought to have descended from wingless ancestors. They thus differ from such insects as wingless ants, which have winged relations and ancestors. In this group there are only 2 orders, the Collembola and Thysanura. The best-known species in Britain belongs to the latter order, and is the *Lepisma saccharina*, the silver-fish, found in kitchens.

**Apteryx** (Gk. a privative, and *πτερόν*, wing), or **Kiwi**, a bird found only in New Zealand, is a ratite bird of the family Apterygidae. The tail and wings are minute and useless, the feathers are hair-like, the beak is long and weak. It is about the size of a hen, is nocturnal, insectivorous, and lays a single large-sized egg.

**Apuan Alps**, a branch of the Etruscan Apennines, 30 m. long, lying parallel to the Ligurian Alps and falling very steeply to the Mediterranean. The greatest altitude is reached in Mt. Pisanino (6382 ft.). They are noted for beautiful white marbles (Carrara, Massa, etc.).

**Apuleius**, **Lucius** (b. A.D. 130), a Rom. satirist and rhetorician, b. at Madaura, N. Africa, was the son of a wealthy magistrate. He studied at Carthage and Athens, and showed a preference for the philosophy of Plato. After the death of his father he used the great riches left him to travel, and went to Italy and Asia. The outcome of this was his great satire *The Golden Ass*, a prose romance purporting



APSIDES

to narrate the experiences of one Lucius, whom an enchantress had changed into an ass. Justly described as the 'parent of modern romantic literature,' it is veritably 'a gallimaufry of intrigue, sorceries, bickerings, and ravishments, savoured with gaiety and humour, told at the topmost pitch of skyscraping spirits.' The finest part is the graceful tale of Cupid and Psyche, which has been pub. separately more than once. Adlington was the first Eng. translator of the whole of the work (1566). (See also ADLINGTON, WILLIAM.) It was also trans. by Sir George Henry in 1831 in Bohn's Classical Library. A. married a wealthy

widow, and was accused by some of having gained her by witchcraft. His defence was pub., and is a very fine piece of work (*Apologia sive Oratio de Magia*). He spent the latter part of his life at Carthage, and the exact date of his death is uncertain.

**Apulia** (It. *Puglia*), a region of Italy comprising the 3 provs. of Bari, Foggia, and Lecce, with an area of 7400 sq. m. The Apulian Plain forms the N. part, which is rather barren, although sheep are bred there and cultivation of the land is practised in certain spots. The S. part is more hilly, and in the N.W. of this part is the isolated mt. of Gargano, which reaches to the height of 5000 ft. in one place. The R. Ofanto (Aufidus) is the chief waterway of the dist., and there are 4 fairly large lakes. The chief exports of the place are wine, fruit, cereals, and silk. The prin. ports are Gallipoli, Taranto, and Brindisi, while the chief tns. are Foggia, Barletta, Andria, Lecce, and Bari. In anct. times A. was inhabited by sev. peoples, as the Apuli, the Messapii, and the Daunil. It was conquered by the Romans in 317 B.C. The second Punic war was partly fought here, and the battle of Cannæ took place within its borders in 216 B.C. It came under the power of the E. empire, and afterwards became part of the Lombard duchy of Benevento. The Byzantines recovered part of it subsequently, only to lose it again to the Normans, and afterwards Robert II. seized it and merged it under the crown of the Two Sicilies. Pop. 3,027,000.

**Apulum**, see ALBA-IULIA.

**Apuré**, a riv. in Venezuela which rises in the Cordillera Mts. and flows into the Orinoco. The chief tns. on its banks are San Fernando and Nutrias. Its course is about 1000 m., and it is navigable for just over half that distance.

**Apurimac**, a riv. in Peru which rises in the Andes in the prov. of Arequipa. After a course of about 600 m. it joins the R. Ucayali, and finally the Amazon. It also lends its name to the dept., which has an area of nearly 8200 sq. m. The cap. is Abancay, and it yields rubber, rice, and cotton, having also excellent grazing land for cattle-breeding.

**Aquæ Calidæ**, see VICHY-LES-BAINS.

**Aquæ Perennes**, see EPERNAY.

**Aqua fortis**, the old name for nitric acid.


**Aquamarine** (Lat. *aqua*, water, *marinus*, pertaining to the sea), a sea-green or bluish-green variety of beryl which is used as a precious stone. It is found in N. and S. America and in Australia.

**Aqua regia**, a mixture of nitric acid with 4 times its vol. of hydrochloric acid. It derives its name from its capacity for dissolving the so-called 'noble' metals, such as gold and platinum, which are unaffected by most solvents.

**Aquarium** (Lat. *aqua*, water), a small reservoir of fresh or salt water in which aquatic animals and plants are kept for scientific purposes, or for amusement.

Large aquaria are to be found in places such as zoological or botanical gardens and laboratories in which biology is studied.

Owing to the placidity of the water and air, an A. is difficult of aeration; artificial fountains, the presence of green plants, and the action of pouring water from a height are all beneficial. In a salt-water A. the green alga of the genus *Ulva* grows readily, while duckweed will flourish in fresh water. The amateur natural historian will find sticklebacks, minnows, newts, tadpoles, axolotls, and water-snails thrive under his care, but generally fish are difficult to preserve alive. Gold-fish, sun-fish, thunder-fish, and cat-fish frequently are denizens of aquaria, but they are liable to be attacked by a fungus disease which usually proves fatal. Insufficient aeration and decaying food will cause a white, film-like substance to cover their bodies, hamper their movements, infect their neighbours, and work speedy havoc among them. It may sometimes be removed by placing them in water in which salt has been dissolved, or by gentle application of a soft paint-brush when the patient is under running water. The *Triton cristatus*, a large newt, is a hardy, carnivorous amphibian which requires a large receptacle, and at certain periods of the year prefers to live on land. See E. G. Boulenger, *The Aquarium Book*, 1925; G. C. Bateman, *Fresh Water Aquaria*, 1936.

**Aquarius**, a group of stars forming the eleventh sign of the zodiac. This constellation is supposed to bear a resemblance to a water-bearer, hence its name and its hieroglyph . The sun enters this constellation on Jan. 21. The origin of the name has been traced by some to the fact that the Nile rises during the month of A., whilst others attribute it to the rainy season in India. No star in A. is brighter than the fourth magnitude, but it includes some interesting double stars, a fine star-cluster, and the 'Saturn' nebula.

**Aquatic Animals** is a vague and wide term applied to animals which cannot exist without water, to amphibians which take to it on occasions, and to animals which are also perfectly at home on land; it includes those which respire air by means of lungs, or water by means of gills, vibratile cilia, or any other apparatus. They are distributed over the whole world.

Most of the lower invertebrates are truly A.: sea anemones, jelly-fish, many of the annelids, even earthworms, and crustacea, such as crabs and lobsters, cuttle-fish, molluscs, such as mussels and cockles, with the exception of some gasteropods, would perish if exposed to the sun and deprived of water. Among vertebrates fish are exclusively formed for inhabiting a fluid medium; they breathe by gills, are covered with scales, their form is elongated and compressed, the eye is suited to the dense medium of the water, they balance themselves on fins, and the



laterally compressed tail serves as a paddle. Among reptiles, crocodiles and turtles may be regarded as truly A.; they breathe air, however, and come on land to lay their eggs. Nearly all A. birds (except, e.g., the water-ouzel) have webbed, oared, or lobated feet, as grebes, auks, puffins, razorbills, geese, ducks, pelicans, gannets, and gulls; the penguin is as awkward on land as a seal, and as much at home in the sea. Among mammals the whales and porpoises are most truly A., having a smooth and oily skin, a layer of blubber covering the internal viscera, and they are constructed to permit a long cessation of respiration while submerged; walrus and seals obtain their food in the sea, but breed and repose on rocks; their fore-limbs are formed into paddles, the hind limbs are placed far back and are also paddles or oars, and every part of their internal structure is saturated with oil. Other A. mammalia are usually only web-footed and visit the water for prey (e.g. the otter).

**Aquatic Plants** are known in botany as Hydrophytes (Gk. *ὕδωρ*, water, *φύον*, plant), and the term of Hydrophyta has sometimes been applied to the algæ, rather illogically, since all water-plants do not belong to that div. The Hydrophytes form a large group of flowering plants, and differ from Geophytes, which are rooted in the soil, and Epiphytes, which use other plants for support, chiefly because they dwell in the water. Plants are also grouped according to their habitat into Hydrophytes living in water, Xerophytes, those found in very dry conditions, e.g. the *Cacti*, and Mesophytes, the vast majority of plants, growing in medium conditions of humidity, i.e. in ordinary damp soil. There are, however, many incidental peculiarities of structure and pollination in Hydrophytes which are not present in their geophyte relations, and when transplanted to soil become extinct. They are not influenced by changes of temp. to such a degree as their earth-grown neighbours, hence many of them are perennial. They frequently form winter-buds, which hibernate at the bottom of the water and develop in the early spring (e.g. *Utricularia*, or bladder-wort, and *Potamogeton*, or pond-weed). Besides this asexual reproduction there is the ordinary sexual reproduction common to flowering plants, many of the flowers being above the water and pollinated by insects or the wind; several, e.g. *Zostera*, or eel-grass, have submerged flowers, of which the pollen grains are thread-like and float at any depth of water until finally they reach a large stigma and so come to rest.

An interesting feature of these plants is their heterophyllous condition, for there are no fewer than 4 types of leaves observable in them. Those which live beneath the surface are not cuticularised, and are devoid of stomata, the latter confined to the upper surface, whereas in mesophytes they are usually more numerous on the lower surface, while

those which float on the surface have both cuticle (generally of a waxy nature) and stomata. The 4 types are: (a) ribbon leaves, (b) much-divided leaves; (c) awl-shaped leaves; and (d) entire, rounded or lobed surface leaves. The ribbon leaves are found in plants which grow in running water, e.g. *Zostera*; the much-divided leaves occur in still-water plants, e.g. *Ranunculus aquatilis* or water crowfoot; the awl-shaped leaves are also submerged, and are found on plants which usually can also grow on land, e.g. *Subularia*, or awl-wort; the floating leaves have large and conspicuous air-spaces, as exemplified in such plants as *Nymphaea*, or white water-lily, *Nuphar*, or yellow water-lily, and also *Ranunculus aquatilis*. Air spaces are also common in the stem. The slimy nature of the hydrophytes is caused by a mucilaginous secretion from surface glands or hairs; the fibrous and vascular tissues are developed to a very slight extent.

Among other interesting A. P. may be mentioned *Elodea*, or Canadian water-weed, *Typha*, or bulrush (also known as cat-tail), *Nelumbium*, or sacred lotus, *Ceratophyllum*, or hornwort, *Sagittaria*, or arrow-head, *Nasturtium officinale*, or water-cress, *Iris pseudacorus*, or yellow flag, *Lemna*, or duckweed, *Stratiotes*, or water soldier. Among these are included a few plants which have their roots in water and the shoots in the air, e.g. the bulrush, and these are often classified as marsh plants. The algæ are treated of in a separate article. See J. C. Willis's *Flowering Plants*, 1908; Agnes Arber's *Water Plants*, 1920.

**Aquaint**, a means of etching on copper or steel to produce pictures in imitation of sepia and Indian ink drawings. The effects are obtained by the action of acid through a porous ground of sand or some thin resinous solutions, on copper sheets. It was invented in the eighteenth century, but is very little used to-day.

**Aqua Tofana**, a liquid poison invented by a woman named Tofana in the seventeenth century. It was tasteless, colourless, and very deadly, even in small quantities. It was sold in Rome and Naples by her daughter. The ingredients have never really been discovered, but it is supposed to have been composed largely of arsenic and lead.

**Aqua-vitis** (Lat., water of life), a term commonly applied to distilled spirits, having the same sense as the Fr. *eau de vie* and the Gaelic *uisge beatha* or water of life—whence whiskey. At one time largely used medicinally, and thought to have the power of prolonging life.

**Aqueduct** is an artificial conduit or channel for the conveyance of water, the term being usually applied to an open channel rather than pipes. As were made on a large scale by the Egyptians and Babylonians, while some of the ant. Gk. and Rom. As. are used to this day. Most of the former are

subterranean, and wonders of engineering skill, but perhaps this mode of getting water from the hills to the tns. was most extensively employed by the Romans. Rome itself was supplied by nine Aa., which brought the water over 60 m., and in some places were built nearly 200 ft. in height. These were formed either by erecting one or more rows of arcades across a valley and making them support 1 or 2 more level canals, or by boring through mt. sides which would have interrupted the water-course.



AQUEDUCT AT SEGOVIA

Ruins of Aa. can be found in many parts of Europe, among which may be mentioned the famous one at Pont du Gard at Nîmes. At Metz in France, and at Mainz in Germany, there are also ruins of the same sort. Spain has one at Segovia, and Portugal at Evora, while in Italy these ruins are very numerous.

The famous Spoleto A., 60 m. N. of Rome, erected in the seventh century, is a wonderful piece of work; and of a later date the Maintenon A., which was begun in 1684 but never finished, is one of the finest structures of this nature in the world, despite its incomplete state. Other Aa. of modern times and still in use are the Bridgewater Canal over the R. Irwell (the first in England), the Croton A., which supplies New York, the Marseilles A., over 60 m. in length, and also those at Manchester, Glasgow, Birmingham, Bombay, and Vienna. In certain parts of the U.S.A., especially California, there are timber Aa. termed flumes, which are frequently carried along steep mountain slopes and across valleys, supported on trestles. They are used to convey water for hydraulic mining,

for irrigation, and timber transportation. The 3 largest Aa. in the U.S.A. are (1) the Catskill, supplying New York, (2) the Owens R., supplying Los Angeles, and (3) the 'Hetch Hetchy' A., completed in 1932, which serves San Francisco. The Catskill has a length of 92 m. (of which 14 m. are tunnel and 23 m. pressure pipes) and a capacity of 500 million gals. per day. The Los Angeles A., which cost about 23 million dol., to construct, has a capacity of 280 million gals. per day and a length of 223 m. The San Francisco A. is 156 m. long, with a capacity of 400 million gals. per day.

**Aqueous Humour** is a watery fluid between the cornea and crystalline lens of the eye.

**Aqueous Rocks**, a term applied to rocks which have been formed by the chemical and mechanical action of the water or by organic depositions. They may be made respectively of chemical precipitates, of former rocks crumbled by the sea and cemented by softer material, or of decayed vegetable and animal life, sometimes called also *sedimentary rocks*.

**Aquiba (Aqiba)**, or **Akibah, Ben Joseph**, called Barakiba by Epiphanius and Hieronymus, lived during the end of the first century and the early part of the second (c. A.D. 50-132). He was a disciple and successor of the Rabbi Gamaliel. He joined the standard of the pseudo-Messias Bar-cochba (*q.v.*) in Judæa, and when the Emperor Hadrian took Bethara, he ordered that A. should have his skin taken off by an iron comb. He was buried in Tiberias. The authorship of the *Jezirah*, the chief book on cabalistic doctrines, has by some been ascribed to A.

**Aquifoliaceæ** (*Inf<sup>ra</sup> aqua*, water, *folium*, leaf), a natural order of dicotyledonous trees and shrubs with leathery leaves. The order has been named after the *Ilex aquifolium*, the holly, and has been characterised by Brongniart as *Illicineæ*.

**Aquila** (Lat., an eagle), a constellation situated above and resting on the zodiacal constellations of Capricornus and Aquarius, and to be found duo S. at 8 p.m. in the middle of Sept., at about 40° of elevation. In the Gk. mythology this constellation represented the eagle of Jupiter, and according to some the bird which was the tormentor of Prometheus. It is conjectured that the name was given when A. was near the summer solstice, and that the bird of highest flight was chosen to express the greatest elevation of the sun. A group of stars, now treated as part of A., were named Antinous by order of the Rom. Emperor Hadrian.

**Aquila and Priscilla**, a Jew of Pontus and his wife, who had settled in Rome, but left when the Jews were driven out by Claudius (*see* Acts xviii. 2). They were dwelling in Corinth when Paul arrived and made their acquaintance, and, as they were of the same trade as Paul, he lived with them. A. and P. left Corinth with Paul, accompanying him

as far as Ephesus, where they took up their abode. Apollos (or Apollonius) was instructed by A. and P. In Rom. xvi. we read that Paul sends his greetings to them, whence it is deduced that they had returned to Rome; but it is probable that they never left Ephesus. What befell them afterwards is not recorded.

**Aquila Ponticus**, a relative of Emperor Hadrian, lived in the second century, and translated the O.T. into Gk. Part of this version is found in Origen's *Hexapla*.

**Aquila degli Abruzzi**: 1. Prov. of Italy, between the Apennines and the prov. of Rome. Produces cereals, flax, hemp, and fruits. Area 2500 sq. m. Pop. 339,000. 2. Cap. tn. of above, on R. Aterno, 58 m. N.E. of Rome. Founded by Emperor Frederick II. on the ruins of Amiternum. Almost destroyed by an earthquake in 1703, but is now a well-built and populous city; a bishop's see; and has a large trade in saffron, and paper, linen, and lace manu. Pop. 55,000.

**Aquilegia**, a genus of Ranunculaceae, literally the water-gatherer, because the leaves collect water in their hollow. *A. vulgaris* is the columbine. The plants are found in temperate lands.

**Aquileia**, anct. tn. of Italy, at the head of the Adriatic. It was built by the Romans in 182 B.C., and strongly fortified, and at one time contained over 100,000 inhab. It was the key of Italy on the N., and in A.D. 238 it was besieged by Maximin, and in 452 destroyed by Attila. Many of the people fled to the lagoons, where Venice now stands. A new tn. was built, but it never regained its former glory. A cathedral was built in the eleventh century. It is now a poor tn. of 2900 inhabitants.

**Aquin**, a tn. on S. coast of Hayti, W. Indies, 72 m. S.W. of Port-au-Prince. Pop. of com., 20,000.

**Aquinas, Thomas** (c. 1226-74) (Thomas of Aquino), one of the most famous of scholastic theologians. He was of noble descent, and was b. at the castle of Roccasecca, the property of his father, the count of Aquino, in the ter. of Naples. He began his education at the monastery of Monte Cassino, after which he studied in the univ. of Naples. Whilst there he came under the influence of the Dominicans, and in spite of violent family opposition was at last permitted to enter their ranks. At the Dominican school of Cologne, whither he was sent, he came under the influence of the greatest teacher in Europe, Albertus Magnus. Later he followed his master to Paris, and was there granted the degree of bachelor of theology. About the year 1248 he returned to Cologne, still with the great Albertus Magnus, in the official position of second lecturer. Already the controversy between the univ. of Paris and the teaching friars had broken out, and Thomas had thrown himself with great zeal into the defence of his own order. So great was his zeal that later he was chosen to defend the

attitude of the Dominicans before the pope himself. The hostility of the univ. to the mendicant orders prevented his taking his doctor's degree until 1257, when, together with the Franciscan Bonaventura, he received that degree. Ecclesiastical honours were his practically for the asking, but he refused them all. The popes themselves were beholden to him for advice, and he was held in high regard by Urban IV. and Clement III.; so great was his love of his own order that he refused the archbishopric of Naples. In 1263 he visited London to take part in the chapter of the Dominican order. The greater part of his later life was taken up in visits to various potentates and in the active service of his order. He was summoned again in 1272 to his professional chair at Naples, and 2 years later he was summoned by Pope Gregory X. to the great council at Lyons. Ill though he was, he set out, but d. at the Cistercian monastery of Fossanova on Mar. 7, 1274. He was canonised by Pope John XXII. in 1323, and later took rank with the great fathers of the Church at the decree of Pope Pius V. in 1567. He is regarded as the patron saint of all Catholic educational establishments, and is still upheld as the teacher of the orthodox Catholic faith.

His teachings are equally important from the point of view of the theologian and that of the philosopher, and substantially his writings are regarded to the present time as the authorities by the Rom. Catholic Church. His style was definite, clear, and concise, and the basis of his system seems to have been mainly that the 2 sources of knowledge were the mysteries of Christian faith and the truths of human reason. The mysteries of Christian faith are to be believed because they help even when they cannot be understood. His greatest books are the *Summa Catholicæ Fidei contra Gentiles* and *Summa Theologiae*.

**Bibliography.**—WORKS: *Opera Omnia*, 25 vols. (Parma), 1862-75; 34 vols., ed. Vivès (Paris), 1871-80. TRANSLATIONS: *Summa Theologiae*, 1912-23, and *Summa contra Gentiles*, 1924-29, trans. by members of the Dominican Order; the latter also trans. by J. Rickaby, 1905, under the title of *God and His Creatures*; M. C. D'Arcy (ed.), *Thomas Aquinas; Selected Writings* (Everyman's Library), 1939. LIVES: R. B. Vaughan, *Life and Labours of St. Thomas of Aquino*, 1871-72; A. E. Taylor, *St. Thomas Aquinas as a Philosopher*, 1924; G. K. Chesterton, *St. Thomas Aquinas*, 1933; W. R. O'Connor, *The Eternal Quest* (New York), 1947.

**Aquincum**, an anct. Rom. citadel, situated near Budapest. The name is supposed to be a corruption of 'Aquæ-quincæ' (=5 springs), and to refer to the springs issuing from the foot of the Blocksberg.

**Aquino**, an anct. but decayed tn. in the prov. of Campania or Terra di Lavoro, in the kingdom of Naples, stands 6 m. W. of San Germano, the anct. Casinum. It was a Rom. colony

and a large and populous city in the time of Strabo: the Via Latina passed through it. Juvenal, the Rom. satirist, was b. at or in the neighbourhood of Aquinum. Pescennius Niger, one of the competitors for the empire after the death of Pertinax, was also, a native of this place. The church of Santa Maria della Libera suffered greatly in the Second World War, the nave, roof, and the roof of one aisle being destroyed, and the church of San Tommaso was ruined beyond repair. Pop. 2833.

**Aquisgranum**, anct. Rom. name for Aachen, or Aix-la-Chapelle (*q.v.*).

**Aquitania**, a Rom. prov. of Gaul, including the ter. between the Pyrenees and the Garonne. The inhab. were of the Iberian tribes and Celtic families who had settled there. A. was conquered by the Goths in the early part of the fifth century, a century later by the Franks. After being a duchy for some time, it was united to the Fr. crown in 1137. Gascony became a part of A. in 1054. In 1152 it passed under the Eng. crown through the marriage of Henry II. with Eleanor, the divorced wife of the Fr. king, but it was lost to England again in 1452.

**Aquitanus Sinus**, anct. Rom. name for the bay of Biscay (*q.v.*).

**Ara** (Lat., an altar), a constellation situated to the S. of the zodiacal sign Scorpio, and so low in the heavens as not to be visible in Great Britain. In it are 1 or 2 variable stars, one, Rho Ara, being eclipsed once in every 58 hrs.

**Ara** (dimin. of *aracae*, native name), a genus of tropical birds, the macaws, of the family Psittacidae, or parrots, and tribe Cuculiformes. It has a curved and powerful beak, a long tail, and vivid plumage, and can live in captivity. *A. macao* is found in Brazil, *A. militaris* in Mexico.

**Arab (Horse)**. The original home of the A. is unknown. Some think that, like the Barb (*q.v.*), the A. breed are descended from the 'Libyan' horse; but they were certainly to be found ultimately in the Nejd, Central Arabia, and in the fifth century A.D. were a special breed belonging to the Bedouins. By the sixth century the A. tribes were carefully breeding (or in-breeding) from them, and the purest breeds are still to be found in the Nejd. They were a decisive factor in the conquests of the Mohammedan Saracens, and, in the course of centuries these A. horses developed into the superb strains which were eventually to improve the standard of horses throughout Europe. Only a small proportion of horses bred in Arabia are pure As., and these are known as the Kohl (antimony) on account of their bluish-black tint. Legend has it that the 5 chief families ('El Khamseh') of the A. are descended from a mare known as Kehalet Ajuz (the mare of the old woman); but, however that may be, the Bedouins recognise 5 Kohl-ant strains, the first and most numerous strain being the Kehallan, which are largely bays, with a white 'star' and

1 or 2 white feet, and are reputed the fastest though not the hardiest of the 5. These are the most like the Eng. thoroughbreds, being more nearly related to them than the others. The Darley Arabian—the most famous of all E. horses ever brought to England—bought in Aleppo by Mr. Darley, H.M. consul, in 1704—was a pure bred Kehallan. The Abeyan strain, a smaller if handsomer horse, does not so strongly resemble the Eng. thoroughbred. A characteristic of the A. is the peculiar way he carries his well-elevated tail—very still and without the usual sideways swing—while at the gallop his dock is carried almost vertically. The A.'s weak points are a tendency to 'owe-neck' and excessive thickness of shoulder, the latter being one of the reasons why the A. is not a fast horse judged by modern standards. A height of 14.2 hands is the proper height for the A., so that As. are really little more than ponies. The fact that cross-breeds are sometimes taller than pure breeds does not necessarily indicate an inferior stock, for cross-breeds are frequently taller than their dams or sires; whence we may infer that the size and strength of our modern Eng. horses are not solely due to A. blood. Pure-bred As. are of most colours, but the bay and grey predominate; there are also many chestnuts, and sometimes browns and blacks. A feature of the A. is his endurance; but, as regards speed, the A., owing to careful crossing, is quite outmatched by modern Eng. racehorses. Nor, again, do As. make good jumpers, steeplechasers, or hunters. The A., however, makes an excellent light cavalry horse, though, owing to mechanisation of cavalry, this is a factor of no great importance in warfare to-day. Consult Prof. J. C. Ewart, *The Multiple Origin of Horses and Ponies*, 1908; W. Ridgeway, *The Origin and Influence of the Thoroughbred Horse*, 1905; A. J. R. Lamb, *The Story of the Horse*, 1938; Lady Wentworth, *The Authentic Arabian Horse*, 1941.

**Arabah** (arid, desert region), the geographical name of that great depression of the land in which are found the sea of Galilee, the Jordan, and the Dead Sea (Joshua xi., xii.). In the A.V. of the Bible the word is trans., being generally rendered by plain, but also by wilderness or desert. The hollow known to-day as El-'Arabah stretches southwards from the line of cliffs (the Ghor) which cross the Jordan Valley from N.W. to S.E. In its S. reaches it forms 'the wilderness of Zin' (Num. xxxiv.). It well justifies its name, Arabah, desert steppe. Its undulating surface is formed of loose gravel, stones, sand, and stretches of mud. It is torn by water-courses from either side, converging on Wadi et Jaib. It is bounded on the W. by the limestone uplands of Et-Tib, the wilderness of Paran, and on the E. by the fantastically shaped and naked crags of Edom.

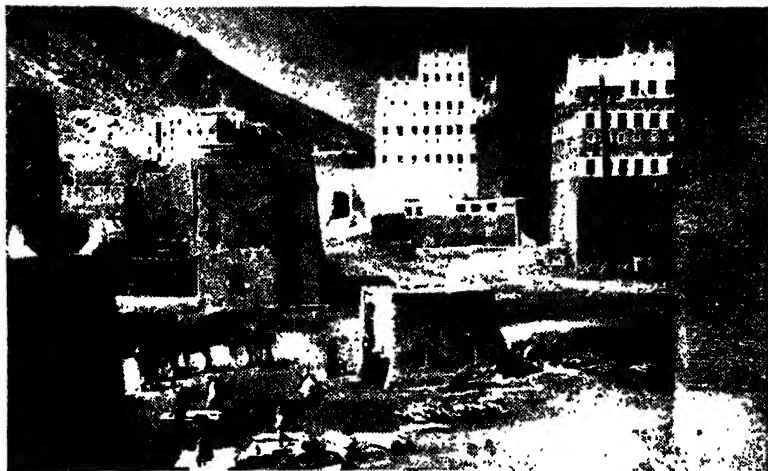
**Arabesque, or Moresque**, is a term in painting or sculpture applied to a special kind of ornamental frieze or

border supposed to have been introduced into Europe by the Moors at the conquest of Spain, although traces have been found at Rome and Pompeii which prove it must have been known in Europe in some form previously. It is fantastic in design, and in many cases introduces griffins, dragons, and other fabulous monsters.

Arabgir, or Arabkir, a tn. in the prov. of Sivas in Asiatic Turkey. Manufs. silk and cotton goods. Pop. about 20,000.

Arabia (Arabic *Jesirat-al-Arab*, 'The Tall or Peninsula of the Arabs'; Persian

Musa, or the Mt. of Moses, has been identified as the Mt. Sinai (Horeb) of the O.T. The atmosphere is particularly hot and dry, and there is an almost total absence of clouds. Owing to the climatic conditions and the insufficient extent and height of the mts., little rain is attracted, with the natural consequence that there are few rivs., and those rarely permanent; the beds being dry except after a heavy rains. To these conditions the unusual degree of cold sometimes felt may be ascribed, as snow and ice are frequently found on mts. of 6000 ft.,



E.N.A.

ARABIA: THE HADHRAMAUT  
Houses on the ramparts of the old town at Seyun.

and Turkish, Arabistan), a peninsula forming the S.W. extreme of Asia. Bounded on the N. by Asiatic Turkey, on the E. by the Persian Gulf and gulf of Oman, on the S. by the gulf of Aden (Indian Ocean), and separated from Africa on the W. by the Red Sea and by the gulf of Suez at the N.W. extreme. Lies between 12° 45' and 34° 30' N. and 32° 15' to 60° E. The area is computed to exceed 1,200,000 sq. m., the length from N. to S. about 1500 m., and the greatest width about 1250 m. About one-third of the whole area is desert land, and much of the whole country is still unexplored, although it is known to be arid and practically uncultivated. The centre of A. forms a vast plateau or table-land falling from the mt. ranges on the W. coast to the R. Euphrates at the N.E. and the Persian Gulf on the E.; the height attaining to 8000 ft., while in some cases the summits even approximate 13,000 ft. Of the mts. Jebel

although in Africa, across the Red Sea, they are only to be found at about twice this height. On the W. coast there is a summer rainy season of 2 or 3 months, but in the S. little rain falls and then in the winter. Among the hottest inhabited places in the world are Muscat and Mocha, where the temp. has been known to exceed 115° F. in the shade.

A. has been divided into three parts: (1) A. Felix, or Fruitful; (2) A. Petraea, or Stony; (3) A. Deserta, or Desert. These dists. are not known as such to the Arabs, but may be described to include generally, (1) Hasa, Hadhramaut, Oman, and Yemen; (2) Hejaz; and (3) Nejd.

Owing to the small and irregular rainfall, little of the country is cultivated except in the wadis or valleys which receive the water from the mts. In the desert, however, occasional oases or fertile spots are found, and on the mts. large quantities of juniper and often pomegranates, with sometimes

many of the fruits grown in European countries, such as plums and grapes. In the wadis and cultivated tracts of land along the coasts, coffee, cotton, figs, dates, almonds, cane-sugar, tamarinds, citrons, wheat, barley, rice, and the trees which yield gum-arabic and frankincense are produced.

The mineral resources are little known, but include copper, iron, lead, and many kinds of precious stones, such as emeralds, carnelians, onyx, agate, and also marble and alabaster. In the is. of the Persian Gulf there are also extensive pearl fisheries.

Among the animal life are to be found the lion, tiger, jackal, antelope, lynx, hyena, jerboa, monkey, gazelle, wild boar, and wild ass, while ostriches, donkeys, goats, sheep, and oxen are reared. Perhaps the most outstanding of all is the camel, which is largely used for domestic purposes and transport. By nature stupid and bad-tempered, the camel has never been thoroughly domesticated, although we have record in the Bible of Job being the owner of a large number. The average life of a camel is 45 years. The milk, being nutritious, is largely used, and the Arabs cut the hair, from which a coarse cloth is made. In crossing the desert, camels, which have been aptly termed 'ships of the desert,' frequently go for 5 days without drink, and are capable of carrying a load of 600 to 900 lbs. Well known, too, is the beautiful breed of Arabian horses, whose great qualities are speed and endurance.

It is probable that the various Semitic peoples migrated from A.; the Jews and Arabians being the prin. branches of that race. Arabian historians trace the people back to 2 sources, Ishmael and Kahtan (sometimes called Joktan), distinguishing the branches by the names of Ishmaelites and Kahtanites. The former, living in the N., are considered as naturalised Arabs by the S. or pure Kahtanites. This distinction is traditional only, as a number of the Ishmaelites have settled down to an agric. life among the Kahtanites, forsaking the wandering tribes of Bedouins, while others of the Kahtanites have taken to a nomadic life in the deserts. So far back as we can trace, A. has had a great influence in the spread and cultivation of literature, and for a long time was much in advance of the rest of the world in literature, science, and art. At the present day illiteracy even among the Bedouins is unknown; reading, writing, and some mathematics being taught to every child. Invariably the people live in tribes whose chieftains, usually hereditary, but sometimes elected by the men, have little actual authority other than they secure by their own merit in counsel. Tribal wars, which were at one time intermittent, have practically ceased, but politically each tribe is still really independent of the others. Mohammed, preaching the religion of Islam (which imposed on its followers the pilgrimage

to the Kaaba at Mecca) and a united A., did indeed for a time bind the tribes together throughout the whole peninsula, but this state did not long survive his death. The effect, however, on the language was to make that of the Koran, Arabic, universal throughout the land. While the laws of property are but poorly defined, good faith is universal and disputes are settled by meetings of the tribe. Courage, lack of imagination, passion, love of poetry, and hospitality are characteristics, while usually the Arab is proud and quick-witted. Generally he has but 1 wife, although the more well-to-do have frequently several, divorce being secured at will by pronouncement by the husband.

In view of the isolated situations of the cultivated plots of land and the consequent nomadic tendencies of the inhab., the early hist. of A. is the hist. of numerous small tribes and, as is usual in such cases, little record of the doings of the people is left. We have, however, some knowledge of wars made upon the Arabians by neighbouring countries from the writings of their historians, and from inscriptions which have been found it is thought possible that, by exploration, further writings may be discovered which will throw light on the earlier political life of the country. So that, if and when found, the script may be important in its relation to our knowledge of the migrations of the Semitic races. From these writings we have information of a people known as Sabæans or Himyarites, and it was over this people that the Queen of Sheba, who is mentioned in the Bible as having journeyed to see Solomon, reigned. No record of this queen can be found, however, in the Sabæan writings. These records date to c. 1500 B.C., and at this period we find record of another people, the Minæans, who dwell in Yemen and were at war with the Sabæans leagueed with the Assyrians. It had been the intention of Alexander the Great to conquer the land, but he d. before the attempt was made. Time and again through the centuries the Abyssinians had invaded the country of the Sabæans, frequently obtaining control for a time, but only to be thrown out by the inhab. Augustus Octavianus sent an army into Yemen under Aelius Gallus to obtain command of the route to India, but was defeated. From this time until Mohammed came into power the country was sometimes independent and sometimes under foreign control, and internally the N. was almost consistently antagonistic to the S.

The power of the prophet will be better realised when it is considered that the whole pop. was divided into small and more or less independent tribes, whose relations to each other were generally unfriendly. With the growth of Mohammed's power these tribes laid aside their feuds, and, joining under his command, drove out or slew the Jewish inhab. It was not,

however, until after the prophet's death that the gospel of Islam spread actively beyond A., as his own time had been occupied in subjugating the tribes, one by one, and bringing them all into his camp. Egypt, the N. of Africa, Palestine, and the Sp. Peninsula were all welded into 1 vast empire with A. In the sixteenth century, however, A., which had again become disunited, was attacked by, and portions came into the hands of, sev. foreign powers, notably the Turks and Portuguese. By degrees the tribes resumed their authority, driving out the invaders. In the middle of the eighteenth century Mohammed ibn-Abd-il-Wahab came forward to restore the pure faith of Islam, and founded a dynasty which expanded and ultimately, after his death, included Medina and Mecca. In 1811 a war took place between this dynasty and the viceroy of Egypt, Mehemet Ali, which terminated in the conquest by Ibrahim Pasha of the Wahabi monarchy in 1818. Twenty years or so later, however, the Wahabites regained their freedom, but were separated from the dist. of Oman, which declared its independence.

The Arabic language is one of the old Semitic tongues and is known where the faith of Islam is received. The classical Arabic of the Koran is recognised as the standard of purity; in this form it is spoken in central A., with differences of dialect in the rest of the country. That used in Assyria and Egypt is less pure.

In appearance the Arab is sinewy, of medium height, with sharply cut features and a brown complexion. His actions are athletic and energetic, if a little restrained.

The pop. is variously estimated from 3,000,000 to 5,000,000. The prin. tns. are Mecca, Medina, Aden, Mocha, and Muscat.

The most profound change wrought in A. by the operation of the First World War was the hastening of the evolution of the anct. tribal organisation of the Bedouins into the communal and civic life of the State. This transition is, of course, very far from complete. The patriarchal system is still to be found and the civic life of the Arab of Medina or even of Bagdad is as yet far removed from that of a European nation. Arab prejudices and traditional die hard and it is only during the last half century that the old pursuit of agriculture has been recognised as a fit occupation for other than the descendants of slaves. Immobile as the oriental generally is, the Arab, in particular, has leanings towards W. ideas, though in so barren a country the march of progress is slow. The nomad life still has innumerable followers, while among the powerful Wahabi tribes, the most masterful in A., a reaction to orthodox Islamism, with its abhorrence of occidental customs, is a possible menace to Brit. interests in India, Egypt, and the Middle E. But the growth in the past 30 years of a strong Arab nationalist

sentiment among the tribes E. of Syria and in the borderland of Iraq has taken deep root. The patriarchal organisation had received its death-blow, and, with its decay, revolt against the Turkish hegemony grew. In the First World War the Turks suffered incalculably in prestige through their resounding defeats. Always chafing against Turkish domination, the Arabs were not loath to avail themselves of the opportunity of throwing off the yoke. It required no little experience in Arab psychology to win their alliance; but eventually the prin. Arab chieftains threw in their lot with the Allies and co-operated effectively in the ultimate overthrow of the Turk.

The chief figure in this anti-Turkish revolt was Ibn Sa'ud, sultan of Nejd and successor to Hussein as king of the Hejaz. It was his work, before the First World War, in welding the agglomeration of Wahabi tribes into communal organisations of some political significance which set the seal on what was to follow. Having wrested the Haasa region from the Turks in 1913-14, he had paved the way for the eviction of the Turk, during the First World War, from Yemen, the Hejaz, and other regions.

In the First World War Ibn Sa'ud and the shereef of Mecca (Hussein or Husein, king of the Hejaz) allied themselves with Great Britain, while Ibn Rashid, whose dynasty had been wrested from the Nejd cap. Riejadh in 1901 by Ibn Sa'ud, was in alliance with the Turks. Ibn Sa'ud was defeated in 1915 at the battle of Jurrab, and took no further part in hostilities till the last year of the war. Meanwhile, in the Hejaz the Brit. forces were engaged in successful operations for the Hejaz railway (1916-18) and in the Akaba, Tafil, and Ma'an regions (1917-18); while in S. Arabia, successful operations were carried out in the Babel-Mandeb (1914-15). Arab forces in revolt against the Turks attacked Medina in June 1916 and in the same year captured Jeddah, Mecca, and Taif; and other Arab forces, under Sheikh Feisal (later king of Iraq), co-operated with the Brit. Army under Gen. Allenby in their operations beyond Jordan and in the final offensive in Syria. In 1918 Ibn Sa'ud, encouraged by the defeat of the Turks, renewed his campaign against Ibn Rashid, but with only indifferent success. In this renewal of hostilities he was primarily anxious to secure the oasis of Khurma on the W. frontier of the Nejd, which ter., however, Hussein claimed as part of the Hejaz. This dispute precipitated the Arabian war of 1919, when Ibn Sa'ud routed Hussein's forces at Turaba and in due course annexed Khurma and, later, Abhah and other ters. In Asia. In the following 2 years his victorious Wahabites seized Hail, the cap. of the Jubal Shammar provs. in Central A., the Janf region of the Shalan dynasty (1922), and the Kharbar and Thura provs. on the frontiers of the Hejaz (1922), until, by 1926, his possessions and influence extended throughout desert A.

In this conflict the Brit. Gov., from a desire to act with the utmost impartiality, was faced with a situation of extreme delicacy. It had at one time or another during and after the First World War negotiated successfully with most of the Arabian shereefs. In 1915 it had induced Hussein, in consideration of a guarantee of independence to all the Arab states, to head the revolt against the Turks. Hussein was at that time only grand shereef of Mecca, but in 1916-17 he had seized Mecca and Jeddah and proclaimed himself king of the Arabs, but this grandiose title was not recognised by any other nation, for even Great Britain recognised him only as the king of the Hejaz. In Apr. 1921 the Brit. Gov. announced its recognition of his son, the Amir Abdullah, as ruler of Transjordan, subject to constitutional guarantees, and in Aug. of the same year proclaimed a younger son, the Amir Feisal, as king of Iraq. This astute compromise had the effect of checking the inordinate aspiration of Hussein to the overlordship of all A., a position which would only have provoked the most active hostility of the equally ambitious Ibn Sa'ud. Not content, however, with this partial concession to his pride, Hussein, in 1924, accepted the caliphate, rendered vacant by the deposition of Caliph Abdul Mejid by the National Assembly under Kemal. This was by no means an unnatural step in view of his previous title of grand shereef of Mecca. It provoked, however, such bitter dissension with other shereefian rulers and with Ibn Sa'ud that the Brit. Gov. convened a conference at Koweit in the hope of getting them to reach a settlement. The attempt was not successful, and a few months later Wahabi troops invaded Hejaz, seized Taif, and defeated the forces of the shereefs at Haddah. Hussein, then in feeble health, abdicated and was taken to Cyprus under the care of the Brit. Gov., his third son Ali assuming the vacant and tottering throne, but moving his gov. to Jeddah. But 2 months later, the Wahabis having taken Mecca and Medina without serious opposition, Ali too abdicated, and by 1926 Ibn Sa'ud had become king of the Hejaz as well as sultan of Nejd. Thus early fell the artificially created Hashimite dynasty of the Hejaz. Great Britain had 'backed the wrong horse.' It now remained to treat with Sa'ud, who was now in a position to control almost the entire Arabian peninsula. Brit. pre-occupations were mainly concerned with the frontiers of Iraq and the integrity of Transjordan, and in 1925 Sir Gilbert Clayton, the Brit. plenipotentiary, signed an agreement with Ibn Sa'ud under which, in consideration of a subsidy of £70,000, these and other objects were secured. The success of the Wahabis in this vindication of their predilection for simple modes and the patriarchal form of gov. with local administration through cadis and sheikhs, thus again emphasised the extreme conservatism of the Arab; and un-

doubtedly the creation of the second Wahabi Empire, under Ibn Sa'ud, who had previously been the Wahabi sultan of Nejd and its dependencies, was the outstanding event in modern Arabian hist. In the days of the peace conference (1919) he was almost unknown to Europeans. Hussein, after the Iraq settlement, was thoroughly disaffected with all that had resulted from his wartime negotiations, and so began to be obstructive in the direction of Central A.; but Ibn Sa'ud was ready to try conclusions with him. Matters, as shown above, came to a head in 1919. The Brit. Gov. were wrongly advised that Ibn Sa'ud was a negligible factor, while Hussein had trained armies and masses of arms. But though by 1924 he had routed Hussein, seized Taif and Mecca, and made himself king of the Hejaz, he never challenged the position of Great Britain and France in the mandated ters. In the reorganisation of gov. in the Hejaz, Ibn Sa'ud compromised between the old or traditional methods which had suited the needs of administration in the Nejd, and the modern democratic ministries and councils, which had been in process of evolution among the rulers of the sharifian dynasty; making his 2 sons viceroys in the Nejd and the Hejaz subject to his control. Political difficulties arose, in the meantime, in the Yemen, owing to Britain's position as a mandatory in Iraq and Palestine and to the conflict of interests on the Red Sea between Great Britain and Italy. Italy recognised the independence of the Imam Yahya of Yemen, but she was alone in so doing, and subsequently the Asir region of the Yemen became embodied in a Wahabi protectorate, and later, after a brief war with Saudi A., fell to that kingdom. Relations between Great Britain and the Yemen have, however, markedly improved since that time; a treaty of *bon accord* was concluded in 1934, though, in 1939, the Imam began to reiterate his claims to Shabwa, which Great Britain claims to be within the Aden Protectorate and values for its strategic position. In 1927 a gathering of the tribes of Nejd begged Ibn Sa'ud to take the title of king of Nejd and its dependencies by way of counterpoise to his regal style in the Hejaz, and a decree was accordingly issued changing his title; 5 years later this kingdom was re-named Saudia, and eventually Saudi A. In 1927 Sir Gilbert Clayton made a treaty of *bon accord* with Ibn Sa'ud, under which Great Britain formally recognised the absolute independence of Ibn Sa'ud, while Ibn Sa'ud agreed to respect the treaties made between Great Britain and the Arab chiefs on the Persian Gulf. Two years later the Brit. Gov. manifested its confidence in the Wahabi kingdom by raising the status of its agency and consulate at Jeddah into a legation.

The former distinctive features of Middle E. civilisation are perceptibly



disappearing under the pressure of W. ideas. The caliphate system of gov., which, indeed, was an anachronism early in the twentieth century, has for some years been superseded by constitutional or nationalist forms of gov. on W. models. Industrialisation, fostered by European capital, is changing the livelihood of the Arabs of Syria, Palestine, and Iraq—the ters freed from the Turkish overlordship. Education, the film, and the press are shaping the minds of the young Arabs towards new ideals. How long it will take for all these new influences to be felt in the Arabian peninsula itself is conjectural; but that the kingdom of Saudi A. can remain spiritually and materially isolated for a great length of time would seem improbable. While, politically, the different Arab states still pursue their separate destinies, most educated Arabs cherish the hope of an eventual Arab federation which shall restore to them something of the imperial power which in former ages dominated a civilised world. Inherent cultural and economic conditions, however, are incompatible with an early realisation of this dream. Moreover, the peninsular Arabs still preserve an inter-tribal form of gov., and are intensely jealous of their individual liberties. In 1934 war broke out between the Yemen and Saudi A., in which the Imam's forces were defeated and, as the result, the Asir region and the inland region of Najran were ceded to Ibn Sa'ud. In the following Mar. (1935) an attempt to murder Ibn Sa'ud was made while he was engaged at his devotions in the mosque at Mecca. The would-be assassins had come from the Yemen, and the attempt occurred at a time when the Wahabi king was receiving a Syrian delegation which was urging him to take the leadership in a movement for an Arab federal union. Ibn Sa'ud, however, gave no encouragement to the scheme. Disorderly tribes are a constant menace to caravans, especially on the borders of the Aden protectorate, and in recent years the sultans of Lahaj and of Shehr and Mukalla have asked the Brit. Gov. at Aden to send punitive flights of the R.A.F. to bomb villages by way of repression. This, coupled with the addition to the Aden protectorate of a substantial piece of ter., has provoked hostile criticism from those who are unacquainted with the difficulties of keeping order among these turbulent tribesmen.

In mandated Palestine unconditional political sovereignty, whether Arab or otherwise, was remote, as might be realised from the White Paper on Brit. policy issued in May 1939, which envisaged the ultimate creation of a Palestinian State in treaty relationship with the Brit. Gov., together with safeguards for the Jewish minority. The Palestinian Arabs, however, did not favour this scheme, it being their view, and indeed that of the surrounding Arab states, that they were explicitly promised their sovereignty in the famous

MacMahon-Hussein correspondence during the 1914-18 war. (See PALESTINE.) None the less Britain so far implemented war-time promises as to promote the independence of no fewer than 5 Arab states—Iraq, Egypt (Arab in the wider sense), the Yemen, Transjordan, and Saudi A. To that very considerable extent has Arab nationalist sentiment been gratified. But mutual jealousies still prevail. Iraq, Syria, and Saudi A. are jealous of each other's political influence, and none of them would tolerate the hegemony of any one of them. Even before the Arabs came, Syria and Mesopotamia (Iraq) were rivals, Syria being regarded, in Turkish days, as the more advanced. To-day, however, the Iraqis have the greater economic stability, owing to their wealth in oil and in cotton potentialities. Intense individualism still characterises these states to-day in Arab leadership, as was shown in the *coup d'état* of 1936 in Iraq, when Ja'far Pasha-el-Askeri, the popular minister of defence, and one-time Prime Minister, of Iraq was assassinated, the elected constitutional Gov. overthrown by the army, and Yassin Pasha, the Prime Minister, driven out of the country. Only a strong educated public opinion can further the ideal of Arab federation—an ideal to which the Syrian Arabs will most probably lead the way, inasmuch as their nationalism is untrammelled by religious differences between Muslim and Christian. More immediately significant, however, than this dream of federation or any political reforms is the revolutionary change brought about by the industrialisation of the Arab countries—a change which may well pave the way for political reforms. Iraq secures enough revenue from her oil royalties to be able to maintain a large army equipped with tanks and aeroplanes, and this enables her to enforce the obedience of the lawless tribal communities on her borders. The effect of industrialisation is to europeanise the Arab, and most marked are the sociological readjustments. Ancient modes of attire and primitive agricultural implements are wont to give place in many parts of A. to methods and habits more adapted to modern requirements. Even the religious outlook of the Middle E. is by no means untouched by modernism, though, as is well said by the competent authority, Mr. Bertram Thomas, 'modernism in Islam has its genuinely religious side and in intellectual circles a phase of agnosticism has been followed by one of religious revival.' But in the E., as in the W., a wider, more secular education is of a certainty prejudicial to the old Oriental fatalism and immobility.

*Exploration.*—Joseph Pitts, of Exeter, (b. 1663) was the first known Englishman to visit the Haramain, the holy ter. of A. forbidden to Christians, and the first to describe the holy cities of Mecca and Medina in his little book, *A Faithful Account of the Religion and Manners of the Mahometans*, pub. early in the eighteenth century (1704). In all he spent some 15 years of adventure

and slavery, and his story, not much known at the time, was recalled, 150 years later, in Burton's *Pilgrimage to Al Madinah and Meccah*. A Danish expedition, under the auspices of King Frederick V., set out in 1761, but of the half-dozen variously qualified men chosen only one, Karsten Niebuhr, a farmer's son, skilled in surveying, survived, for sickness accounted for all the others in A. or on the way to India afterwards. Niebuhr recounts their discoveries in his *Travels through Arabia* (trans. by R. Heron, Edinburgh, 1792). The expedition reached Jiddah and Sana (the cap. of the Yemen). They appear to have been well treated throughout by the Arabs. Niebuhr's book is the first introduction to the whole country of the Yemen, and for more than a generation it remained the only sound authority, not only on the Yemen, but on A. For a generation after his time little was added to knowledge of A. except the coast, which was next visited by James Bruce in 1769 and by Eyles Irwin, an Eng. agent at Mocha, in 1777. But the rise of Wahabism, the capture of Mecca, Napoleon's Egyptian campaign, and the defeat of the Mamelukes by Mohammed Ali all served to stimulate European curiosity in A. and the E. During these years travellers visited the Hejaz, and among the most remembered was a Spaniard, Domingo Badia y Leblich, who travelled under the name of Ali Bey el Abbasi, as a wealthy pedant, equipped with scientific instruments and a retinue of servants. He penetrated Mecca, took ship from Jiddah to Yenbo, and tried to reach Medina, but was driven back by the Wahabis. During his time in Mecca he came into close contact with the court of the sherif, and saw everything in the city, and in his *Travels* (pub. in London in 1816) he gives a very exact picture of the temple. The next great European traveller to come to A. was Johann Ludwig Burckhardt (b. 1784), who, travelling as Sheikh Ibrahim, crossed from Suakin to Jiddah, and visited Mecca, Taif, Medina, and Yenbo. He produced the most detailed account ever written of the Kaaba, the religious ceremonies, the trade, and the inhab. He travelled mostly at night, with the aid of a ship's compass, and gives us only slight topographical information, his chief pre-occupation being the commerce, social life, characteristics, and religion of the Arabs, all of which he closely studied during his 9 months' sojourn. His *Travels in Arabia* appeared in London in 1829, and his *Notes on the Bedouins* (whose benevolence, good faith, and charity he extols) and *Wahabys*, in 1830. After Burckhardt came Richard Francis Burton, who survives in popular imagination almost solely by his famous pilgrimage to Mecca and his equally famous translation of the *Arabian Nights*. This latter is a manifestation of really amazing learning, of a complete acquaintance with Moslem qualities, customs, and habits, besides a

universal knowledge of E. life. He was the first European to travel the Darb el Sharki, the E. road between Mecca and Medina, where water was scarce, despite the wells sunk at the order of Zobeide, wife of Harun al Rashid. Twenty years later he led an expedition to Midjan and during that journey thoroughly explored the coastal area, the wadis of the coastal range, including the Wadi Hamdh, and various areas of mts. Among the earlier explorers in Oman and the Hadhramaut were Lt. James Wellsted, who was sent on a reconnaissance to Oman by the E. India Company in 1835; Col. S. B. Miles, who continued Wellsted's explorations in 1876, crossing the mts. from Sohar into Dahira, and being the first to visit Bireima. Wellsted's map and notes of Oman have not been greatly modified by subsequent travellers, and his general description remains authoritative. Capt. S. B. Haines, of the Indian Navy (and the conqueror of Aden), carried out a thorough survey of the S. Arabian shore in 1834-36. This is the first modern account of the dist. where the Wadi Hadhramaut, the main wadi of the whole vast dist., reaches the sea. He found that the ruins in the Hadhramaut (the Adramytta of the Gks. and the Hazarmaveth of Genesis) pointed to an anct., rich, and advanced civilisation. In 1843 Adolf von Wrede, a Bavarian soldier who had lived in Egypt, carried out a courageous exploration, penetrating from the sea to the edge of the S. Desert. In 1892 James Theodore Bent entered the interior of the Hadhramaut from Mokalla. He produced the first information of the S. interior which was interesting for its general descriptive matter as opposed to the anct. hist. or geography which figures so much in less popular narratives. But up to this time European geographers knew little of the N. inland of A., the cradle of Wahabism. Among the earliest of the trans-Arabian explorers was the comparatively little-known George Augustus Wallin (d. 1854), the fruits of whose highly creditable journey in N. Central Arabia were given but cursorily in the *Journal of the Royal Geographical Society*, 1854. It was the Nejd (or Negd, as he spelt it) that engaged much of his researches, and he threw considerable light on the Arab tribes of the Howelait, and Sherarat, and on the land of the Shammar. Wallin was a Finn, and there are biographies by Elmgren (1865) and Tallqvist (1905). Charles Montagu Doughty's *Arabia Deserta* is a classic of Arabian exploration. With a pilgrims' caravan from Damascus, he reached Medain Saleh, making a record of inscriptions there, and then wandered in the desert, visiting Teima, Jebel Shammar, and Hall, and going openly as a Christian. In his journey towards Mecca he experienced much suffering and was all but murdered; but at Taif his troubles ended, for the grand sherif appreciated the value of Eng. friendships. The geographical results

of Doughty's explorations establish the nature and courses of the main channels of drainage in N. A., especially of the Wadis Handh and Rumma; and they give us the scenery, geology, and orography of Kheibar, besides the nature of the *harra* tracts and the extent of the volcanic areas of that region. Lady Anne Blunt's *A Pilgrimage to Nejd* is a sample record of scenes and events, and, like other travellers, she, and Wilfrid Scawen Blunt, were attracted to the Nejd country. They were the first Europeans to travel by the Persian pilgrims' route to Kerbela and Bagdad, and, among the results of their travels was further information on rock formations and a revision of the map of N. A. from the *harra* to Hail. Capt. W. H. Shakespeare's exploration across A. from sea to sea, begun in Feb. 1914, was a notable feat, for which he had prepared himself in his capacity of political agent at Kuwait in 1909. He discovered the first Sabæan inscriptions in N. A., traversed the Nejd and crossed the N. end of the Tuwaik escarpment to Zilfi, spending nearly 4 months in A. In 1913 Capt. W. H. Lee-Warner explored the Hadhramaut going to Wadi Duwan by the Wadi Himun, visited Shibam, Katan, Seyun, Shabwa, and Terim, during which time he obtained much information on the social organisation and conditions generally of the Hadhramaut. Freya Stark, an experienced traveller in Persia, also visited the Hadhramaut, starting from Mokalla, across the Jol or stony plateau, Sif, Meshed, Katan, Seyun, and Terim, recounting her experiences in *The Southern Gates of Arabia* (1936). The 'Empty Quarter'—the Rub' al Khali, the Great S. Desert of A.—was the objective of both H. St. John Philby and Bertram Thomas, who crossed it within a few months of each other. Until these 2 important journeys, the Rub' al Khali was almost wholly unexplored, and indeed only the fringes of the desert had been touched by their predecessors, though the journeys of G. M. Lees in 1925-26 in Oman and along the S. coast, and of Maj. R. E. Cheesman in E. A. and along the N. borders of the desert, should be mentioned. Maj. Cheesman obtained much useful information in the drainage of the Nejd uplands and on the birds, but his most interesting visit was to the country of dunes and Jabrin, where he learned something of the Murra tribesmen. Bertram Thomas had, previously, travelled along the S.E. desert border lands from Sur to Dhofar—a little-known dist.; but he was fired with the project of crossing from Muscat to Aden, for though Palgrave and Burton had some vague notion of the characteristics of the 'Empty Quarter,' no European explorers had any definite knowledge of it. In 1930 Bertram Thomas made a preliminary survey, in which he estab. that, beyond the coastal ranges of tropical vegetation, there was a single dry wadi system in a huge sandstone steppe, which declined

from S. to N. from W. to E.; and that the whole region was arid and desolate, the resort of Bedouins who led a life threatened with death from hunger and thirst, the sole vegetation consisting of acacias, bushes, and scrub, though in the middle and lower courses of the wadis gazelle, hare, and antelopes were to be found. In short, the very name Rub' al Khali meant, to the Arab, merely the sand and steppe which would not support life. His great journey, in 1932, was concerned with the main features of the region to the N. of the Qara range. Throughout this historic journey he wore Bedouin dress, spoke the local dialects, and abstained from tobacco—an orthodoxy generally calculated to win Arab confidence. His resultant book, *Arabia Felix: Across the Empty Quarter of Arabia*, throws a vivid light on the whole of life in S.-E. A., and is valuable alike to scientist and geographer. The moral and social outlook, the legends, the code of desert manners, the psychological traits of the Bedouin—all are here set forth so that the world may know the soul of a fascinating race. Philby, who was most disappointed at being forestalled by Thomas, could also rely upon a most exceptional knowledge of A., going back for 15 years to the days when he was seconded by the Gov. of India, as a military political officer, to the Brit. Expeditionary Force in Mesopotamia to assist in organising the regions wrested from the Turks. In his journey across the desert from Hofuf he received valuable assistance and encouragement from Ibn Sa'ud. Eastward from Mazainama, across alternating sandy downs and stretches of gravel, he reached the wells of Bir Fadhil, whence he sought the fabled Wabar. This was, as he described it to the Royal Geographical Society, a veritable anticlimax, for many had hoped he would discover traces of some lost city of anct. story. 'I fathomed the legend of Wabar,' he writes, 'I looked down not upon the ruins of an anct. city, but into the mouth of a volcano, whose twin craters, half filled with drifted sand, lay side by side, surrounded by slag and lava. . . . I knew not whether to laugh or cry, but I was strangely fascinated by a scene that had shattered the dreams of years. So that was Wabar!' (*The Empty Quarter*, 1933). Philby and Thomas differ in the spelling, location, and nature of Wabar, especially on the position; but this is to be explained on the assumption that the name Wabar or Ubar is applied by Islamic writers to a dist. and tribe of the earliest period in the S. half of A., and that it was given not only to a particular dist., but to all the central tract between Jabrin and the Hadhramaut. The legendary city of Sheba was discovered by 2 Fr. explorers in Mar. 1934, one being M. Malrause (winner of the Goncourt prize, 1933), after a flight over the Rub' al Khali. Many towers or temples are still standing

on the traditional site. The results of the modern exploration have, geographically, historically, and epigraphically, thrown new light on the various ant. S. Arabian dialects, such as Minean, Sabæan or Himyarite, and Hadhramaut, and they have also yielded further information on the hist. of the old S. Arabian kingdoms and dynasties, besides supplementing our knowledge of O.T. hist. and of Heb. and comparative Semitic philology.

For discoveries in Palestine and Iraq see under those heads.

**Bibliography.**—L. A. Sedillot, *Histoire des Arabes*, 1845; Sir R. F. Burton, *Personal Narrative of a Pilgrimage to Al-Medina and Mecca*, 1855; W. B. Palgrave, *Narrative of a Journey through Central and Eastern Arabia*, 1871; Salih Ibn-Razi, *History of the Imams and Seyyids of Oman* (Hakluyt Society), 1871; J. Gay, *Bibliographie des ouvrages relatifs à l'Arabie*, 1875; W. B. Upton, *Gleanings from the Desert of Arabia*, 1881; F. M. Hunter, *An Account of the Arab Tribes in the Vicinity of Aden*, 1886; E. Hull, *Arabia Petraea*, 1886; C. Niebuhr, *Descriptions of Arabia* (trans. by Sealy), 1889; W. B. Harris, *A Journey through the Yemen*, 1893; J. T. and T. Bent, *Southern Arabia*, 1900; D. G. Hogarth, *The Penetration of Arabia*, 1904; J. Jourdain, *Journal*, 1608-17, 1905; R. D. Phillips, *In the Desert*, 1905; R. Dussaud, *Les Arabes en Syrie avant l'Islam*, 1907; A. Jaussen, *Coutumes des Arabes au pays de Moab*, 1907; K. A. Nicholson, *A Literary History of the Arabs*, 1907; O. Weber, *Edouard Glaser's Forschungsreisen in Sudarabien*, 1909; L. Thomas, *With Lawrence in Arabia*, 1925; R. E. Cheesman, *In Unknown Arabia*, 1926; C. M. Doughty, *Travels in Arabia Deserta*, 1926; J. Hell, *The Arab Civilisation* (trans. by S. K. Bukhsh), 1926; T. E. Lawrence (afterwards Shaw), *Seven Pillars of Wisdom*, 1926, and *The Revolt in the Desert*, 1927; R. Graves, *Lawrence and the Arabs*, 1927; De L. O'Leary, *Arabia before Muhammad*, 1927; Gertrude Bell, *Letters* (ed. by Lady Bell), 1927, and *The Desert and the Sown*, 1928; H. St. J. B. Philby, *Arabia*, 1930, *The Empty Quarter*, 1933, and *Arabian Days*, 1948; B. Thomas, *Alarms and Excursions in Arabia*, 1931, and *Arabia Felix Across the Empty Quarter of Arabia*, 1932; K. Williams, *Ion Saud*, 1933; H. C. Armstrong, *Lord of Arabia (Ibn Sa'ud)*, 1934; W. H. Ingrams, *Social, Economic and Political Conditions of the Hadhramaut*, 1936; Freya Stark, *The Southern Gales of Arabia*, 1936, and *Seen in the Hadhramaut*, 1938; P. K. Hitti, *History of the Arabs*, 1937; G. Antonins, *The Arab Awakening: the Story of the Arab National Movement*, 1938; C. S. Jarvis, *Desert and Delta*, 1938; H. Scott, 'A Journey to the Yemen' (*Geographical Journal*, Feb. 1939), and *In the High Yemen*, 1941; S. Lloyd, *Foundations in the Dust*, 1947; H. R. P. Dickson, *The Arab of the Desert: a Glimpse into Bedouin Life in Kuwait and Saudi Arabia*, 1948. See also bibliographies under various countries.

**Arabian Architecture**, see ARCHITECTURE, MOHAMMEDAN.

**Arabian Gulf**, see RED SEA.

**Arabian Nights**, or **The Thousand and One Nights**, is the name of a very well-known collection of tales, long current in the E. They are supposed to have been derived by the Arabians from India through the medium of Persia. The tales themselves are connected with all subjects, but the connecting link, the thread on which they were strung, is as follows: The Sultan Shahriyar, enraged by the discovery that his bride was unfaithful, made a law that in future all his wives should be executed on the morning after the marriage. This law was duly carried out, until the sultan wedded Shahrazad, the daughter of his grand vizier. This lady was a matchless raconteuse, and by the expedient of leaving off every night in the midst of a fresh tale of surpassing interest, she induced the sultan to defer her execution until the day after, for a thousand and one nights, when her doom was postponed *sine die*. The tales were first introduced into Europe at the beginning of the eighteenth century, by means of the Fr. translation of Antoine Galland. Of some of them no manuscript is known, and Galland took them down from the mouth of a Syrian friend. Lane was the first Englishman to translate them worthily, and his opinion is that in their present form they date back to about 1500.

**Arabic**, **The**. A White Star liner sunk without warning by Ger. submarine on Aug. 19, 1915, off Queens-town. The ship was carrying at the time sev. Amer. subjects, some of whom perished. As a result of Amer. protests the Ger. Gov. offered full satisfaction to America and undertook not to sink liners without warning and without providing for the safety of the lives of non-combatants, on condition that the ship made no attempt to escape or resist. The worthlessness of this pledge was soon exposed.

**Arabic Numerals** are the numerals 1 to 9 with the character zero (0). They came originally from India.

**Arabic**, **Arabi**, or **Arabians**, a small sect of Christians which existed in the third century, chiefly in Arabia. They held that the soul would perish with the body, but that both would be restored at the Resurrection. At the council of Arabia, c. 247, Origen confuted this opinion. See Eusebius, *Historia Ecclesiastica*, vi. 37; St. Augustine, *De Haeresibus* liber, c. 83; J. F. Buddeus, *De Arabicorum Haeresi*, 1713.

**Arabin**, **Arabic Acid**, or **Gummic Acid**, a constituent of gum arabic. Gum arabic consists of the potassium and calcium salts of A. A. The A. A. may be set free by adding hydrochloric acid to the muclage, and may be separated by dialysis, or passing through parchment paper, as the gum passes through with great difficulty. Alcohol added to the solution precipitates the acid as a white amorphous mass.

**Arabi Pasha** (1840-1911), leader of the insurrectionary party in Egypt, 1882, b. of fellah parents in Lower Egypt; began life as a labourer, and served in the Egyptian Army as a private soldier for 12 years. He organised a national party in opposition to the Anglo-Fr. control, obtained the deposition of the ministry, 1881, and became minister of war in the new Cabinet, 1882. He set up as an autocrat, withdrawing the budgets from the Eng. and Fr. controllers. This act resulted in war with England, whose fleet bombarded Alexandria, July 11-12. On Sept. 13, 1882, A. P. was defeated at Tel-el-Kebir, taken prisoner at Cairo, and expelled to Ceylon. The result of his revolt was the establishment of Brit. oversight in Egypt. Pardoned by the Brit. Gov. in 1900, he returned in 1901.

**Arabis** is the typical plant of the Arabide, a tribe of Cruciferae. The species which grow in Britain are known as rock-cress, and to the same tribe belong the watercress, stock, and wallflower.

**Arabistan**: 1. A general oriental name for Arabia and other dists. inhabited by Arabs. 2. A prov. of Persia, known also as Khuzistan.

**Arabkir**, see ARABQIR.

**Aracaju**, city and port of Brazil, and cap. of Sergipe. Pop. 6000.

**Aracari**, the native name of the *Pteroglossus aracari*, one of the toucans. It belongs to the Rhampastidae, is allied to the woodpeckers, and is found in tropical America.

**Aracaty**, tn. and port of Ceara, Brazil. Important commercial centre. Pop. 30,000.

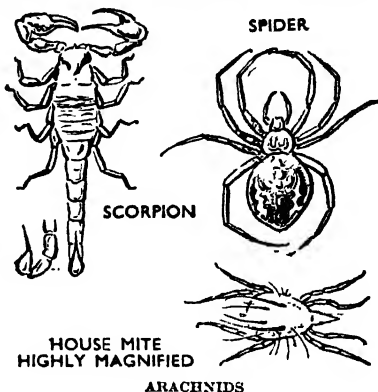
**Araceae**, a natural order of monocotyledonous, chiefly tropical, plants. The flowers are monocious or mono-clinous, the perianth is absent or has from 4 to 6 leaves, there are 1 to 8 stamens, often united into a *synandrium*, the ovary often consists of 1 carpel; the fruit is a berry, and the seeds are sometimes exalbuminous. It contains about 1000 species, of which typical flowers are the *Arum maculatum*, or cuckoo-pint, and *Zantedeschia aethiopica*, or trumpet-lily.

**Arachis**, a plant of the order Leguminosae which grows in tropical parts of Asia, America, and Africa. It yields a sweetish oil used to adulterate olive oil. It has pale yellow flowers, and the pod is forced into sandy soil by the elongation of its stalk, and there it ripens. *A. hypogaea* is the earth-nut or pea-nut.

**Arachne** in Gk. mythology, daughter of Idmon of Colophon, a dyer in purple. She excelled in weaving, and ventured to challenge Athena in the art. She produced a piece of cloth in which the amours of the gods were woven, and as Athena could find no fault with it she tore the work to pieces. A., in despair, hanged herself; Athena loosened the rope and saved her life, but the rope was changed into a cobweb and A. herself into a spider.

**Arachnida** (Gk. *aráχνη*, spider), a class of arthropods, including spiders, scorpions, and mites, differing from insects in having 4 pairs of legs, no antennae,

a fused head and thorax, and simple eyes varying in number from 2 to 12. They are mostly carnivorous; the scorpion has poison-glands leading to the sting. There are 9 orders: the *Scorpionidae* or scorpions; *Pedipalpi*, or whip-scorpions; *Araneida*, or spiders; *Palpigradi*; *Solifuge*, or wind-scorpions; *Pseudoscorpionidae*, or book-scorpions; *Podogona*;



*Phalangidae*, or harvestmen; *Acarina*, or mites. Two doubtful orders also exist: the *Xiphosura*, or king-crabs, and the *Eurypterida*. For further information see under individual heads.

**Arachnoid Membrane**, the thin, web-like membrane of the brain which lies between the pia mater and the duramater. It surrounds the nerve centres, and contains no blood-vessels; it can be separated from the dura mater, to which it adheres by its parietal layer, only by dissection.

**Arachnoides** (Gk. *aráχνη*, spider, *ἴδωρ*, resemblance), an Echinodermatous fossil of the family Scutellidae and order Clypeastroida. It receives its name from the resemblance of the markings to a spider's web.

**Arachosia**, a prov. of the anct. Persian empire, lying in the basin of the Helmand R., and corresponding to the S.E. part of modern Afghanistan. Kandahar occupies the site of its anct. cap., Arachton, founded by Alexander the Great.

**Arad**, a tn. in Rumania; on the bank of the R. Maros. It is an important railway centre, and has a large trade in spirits, wine, corn, and tobacco. It was the scene of much fighting in the seventeenth century in the wars between the Turks and the Hungarians, and in the revolutionary war of 1849 was once captured by the Austrians. Pop. 77,000. New A. is on the opposite bank of the riv. The prov. of A. is 490 sq. m. in extent.

**Aradus**, see ARVAD.

**Araf**, the Islamic half-way region or purgatory between hell and heaven.

**Arafat**, Mt., or *Jebel-en-rahm* (Hill of Mercy), is a granite hill 15 m. S. of

**Mecca.** It is much visited by Mohammedan pilgrims, and is supposed to have been the meeting-place of Adam and Eve after their expulsion from Paradise.

**Arafura, or Alfura Sea,** a div. of the Pacific Ocean, lying between the N. coast of Australia and the W. part of New Guinea, partly enclosed by Papua, the Aru Is., Timor, etc.

**Arago, Dominique François** (1786-1853), b. at Estagel and d. at Paris, was a Fr. physicist and astronomer. He was appointed secretary to the Bureau des Longitudes, and in 1806 helped Biot to measure an arc of the meridian. At the age of 23 he became a member of the Academy of Sciences, and afterwards director of the Observatory. In 1830 he was appointed perpetual secretary to the Academy of Sciences, Paris, and in 1848 was a member of the provisional Gov. He pub. works on astronomy, magnetism, the polarisation of light, and electricity, the titles of some of which are: *Recueil d'observations géodésiques, astronomiques, et physiques*, 1818; *Astronomie populaire*, 1834; and *Notices biographiques*. His complete works were pub. in 1854-62. He was held in great esteem and reputation in all Europe; and opposed Louis Napoleon, and refused to take the oath of allegiance, 1852. See Audiganne's *Arago*, 2nd ed. 1869.

**Aragon**, formerly a kingdom of Spain, but divided since 1833 into the 3 provs. of Huesca, Teruel, and Saragossa. Bounded on the N. by the Pyrenees, on the E. by Catalonia and Valencia, and on the W. by Castile and Navarre. The prov. falls naturally into 2 divs., the level plain of the valley of the Ebro, and the highlands of Upper A. The Ebro is the prin. riv., and receives numerous tribs. from the Pyrenees to the N. and the mts. of the S. The central plain is sterile and is shut off from the sea breezes; it has practically no vegetation save grasses. The highlands, however, are noted for magnificence of their forests and scenery, as also for their fertility. Wheat, maize, rice, and oil are produced in considerable quantities. One of its chief exports is merino wool. Bitter fighting for possession of Teruel occurred during the Sp. Civil war, 1936-39; the Gov. forces captured it in Dec. 1937 and the Nationalist forces recaptured it in Feb. 1938, after which the Nationalist advance gradually lost A. to the Gov. and foreshadowed the close of the war.

The people are of pure race and are probably more closely allied to the Castilians than to the Catalans. Historically it has been a Rom. prov., and after the expulsion of the Moors in 1131 became, under James I., an important kingdom. The union of A. and Castile, under Ferdinand and Isabella, formed the nucleus for the united Sp. kingdom.

**Aragon Canal**, constructed from Saragossa to Tudela by Pignatelli, the It. engineer, during the reign of Charles III. of Spain (1760-88). It had been previously begun in 1529 by the Emperor Charles V. It is 80 m. long, and has an average depth of 9 ft., and a breadth of

69 ft., and is navigable by vessels of 80 tons.

**Aragon, Louis** (b. 1895), Fr. poet; one of the school of Montherlant and Malraux and others who write in a shouting heroic mood. Author of *Le Paysan de Paris*, 1925, very different in mood from his 1942 patriotic fervour. Like others, from Verlaine to the present day, he tried to dispense with rhyme or so to change its role as to renew poetic form; but his *Crève-Cœur* (1943) adds a note of rhyme.

**Aragon River**, riv. of Spain, rising in the Pyrenees in Aragon, and flowing about 80 m. in a S.W. direction through Navarre to join the Ebro at Alfaro.

**Aragon, Tullia** (1510-65), It. poetess of sixteenth century. A natural daughter of Peter Tagliavia d'A., archbishop of Palermo, famous for beauty and learning. Her works, which had a considerable contemporary reputation, include *Rime*, 1547; *Dialogo dell'infinità d'Amore*, 1547; *Il Meschino o il Guerino*, 1560.

**Aragona**, a tn. of Sicily, situated 6 m. N.N.E. of Girgenti. It possesses the old castles of the Aragonese princes. Sulphur is successfully mined near the town. Its pop. is 15,530.

**Aragonite**, a mineral consisting of calcium carbonate, CaCO<sub>3</sub>. It has a sp. gr. of from 2.92 to 3.28 and a hardness of from 3½ to 4. It crystallises in rhombic prisms, and twinning on the prism planes is a frequent phenomenon.

A. is found in Aragon, Hungary, Sicily, Cumberland, and in the neighbourhood of hot springs, as at Carlsbad. It is distinguished from the other variety of calcium carbonate, calcite, by its greater sp. gr. and its different form of crystallisation.

**Aragua**, a state of Venezuela, constituted under the re-division of 1904, and lying mainly within the parallel ranges of the Venezuelan Cordillera. Products: coffee, cacao, sugar. Chief tns.: Maracay, the cap. (pop. 7800), and Barbacoas (pop. 13,090). Pop. of A. about 130,000.

**Aragua, or Rio Grande**, a riv. in Brazil, which has a length of about 1250 m. and flows into the Tocantins, close to São João.

**Arakan**, a div. of Lower Burma, on the Bay of Bengal between Pegu and Chittagong, having an area of about 14,500 sq. m. The old cap. bears the same name, but is generally called Myohoung to-day; formerly a large tn., but now dwindled to little over 2000 people. The dist. exports rice, timber, tobacco, and cotton. The majority of the natives are Buddhists. For the military operations in A. in the Second World War see BURMA, SECOND WORLD WAR, CAMPAIGNS IN.

**Aral, Sea of**, a salt-water lake in Asia, and, after the Caspian Sea, the largest inland sheet of water in this continent. It is in Russian ter., and is about 270 m. long by 165 broad. It is shallow, and nowhere has a greater depth than 220 ft. Two great rvs. drain themselves into this lake, the Syr Daria (the Jaxartes of old) and the Amu Daria (Oxus). At one

time it is thought to have formed part of the Caspian Sea, as only 80 m. of low, sandy, and marshy lands now separate them. It has no outlet, but much water is drawn off by evaporation. A number of small is. are dotted about over it, mainly towards the E. shore. By references of anct. writers it is probable that its shape has altered considerably, and part of its area was once dry land.

**Aralia**, a genus of the order *Araliaceæ*; belongs to India, China, and other tropical countries. *A. (or Fatsia) papyrifera* is a Jap. tree, from the pith of which rice-paper is made. *A. ginseng* has a root which is used as a tonic by the Chinese.

**Aram**, or **Aramæa**, meaning highlands, a term including all the country N.E. of Palestine. Comprised within its limits are Syria, Babylonla, Mesopotamia. The language spoken is Aramaic. This tongue is a branch of the Semitic, which is divided into 2 parts, the W. Aramaic or Syriac, and the E. Aramaic, or, as it is erroneously termed, Chaldee. In Palestine itself Syriac was the language in vogue during the time of Christ. The pure Heb., the language in which the whole of the O.T. was written, was changed after a period of Babylonian captivity to Aramaic. In quoting from the O.T. Jesus Himself uses Aramaic, and in the Talmud, especially that part appertaining to Aramæa, many traces of Aramaic influence are found. In the Targums also, the whole work is composed in Aramaic.

At the present day Aramaic is archaic, though while it was in use it happened to be the poorest in quality of all the Semitic group. Arabic and Persian succeeded it. The inhab. of A. are called Aramæans, and the name itself is strictly biblical. In early times the prin. riv. was the Orontes, and to-day this riv. is the chief water-way of Syria, so it can be said that the present site of Syria coincides with that of A. As far back as Judges mention is made of an Aramæan king extending his ters. as far as Palestine.

**Aram** was a conqueror who went from the W., or Aramæan, or Syrian Cappadocia, into the highlands of Armenia, and from whom the present name of Armenia is derived. (See Moses of Chorene, i. 13, p. 83, ed. Whiston.) This circumstance explains the fact that the Aramæans and Armenians are sometimes confounded (as in Strabo, pp. 41, 42, ed. Casaub.), and that the Armenians themselves do not use the name of Armenia, which first occurs in Herodotus and other Gk. authors.

**Aram, Eugene** (1704-59), an erudite Eng. schoolmaster who gained notoriety by the murder attributed to him. The story of the crime is the theme of Hood's poem, *Dream of Eugene Aram*; and of Lytton's romance, *Eugene Aram*, 1832. B. at Ramsgill, Yorkshire, A. came of humble parentage, but he manifested at an early age a desire for learning. He married early and settled as a school-

master or usher at King's Lynn. The murder was committed at Knaresborough in 1745, the victim being a certain Daniel Clark, a man who had swindled tradesmen and disappeared. A. hid the body in a cave on the banks of the Nidd. The crime remained undiscovered for 13 years, and it was not until 1759 that he was brought to trial at York and, after he had defended himself with great eloquence, sentenced to death. He was a scholar and philologist of some eminence—one of the first to recognise the affinity of the Celtic to the other European languages. He had travelled, and gained much learning, which he embodied in a *Comparative Lexicon of the English, Latin, Greek, Hebrew, and Celtic Languages*.

**Aramæan**, see ARAM.

**Aran, Islands of**, or **South Aran**, are a group of is. situated in Galway Bay, on W. coast of Ireland. They form a natural breakwater. In order from the N. their names are Inishmore (Great Is.), Inishmaan (Middle Is.), Inisheer (Eastern Is.). They contain architectural remains of early origin, among which are the ruins of the abbey of Killenda. For a time A. was a famous seat of religion and learning. Its chief industry is fishing. The total pop. 1600. Another is. of the same name is situated off the co. of Donegal.

**Aranda, Pedro Pablo Abaroa de Boles, Count** (1719-98), a Sp. minister and general, b. at Siétamo in Aragón. In 1740 he entered the army as captain in a regiment of the Castiles. On the death of his father, who was the colonel, he succeeded him, and took part in the war of the Austrian succession. He copied Frederick the Great in his methods of military discipline. In 1766 he was the most important minister in Spain. He d. at Epila, after his fall, due largely to his attitude of sympathy with the Fr. Revolution.

**Aranjuez**, a tn. of Central Spain in the prov. of Madrid and situated on the l. b. of the Tagus. It is a junction of the main S. railways to Madrid, with a pop. of 12,000. The arid plain around it gives the profuse vegetation the appearance of an oasis, which fertility it owes to the presence of a rapid of the Tagus. The prin. industry is farming and the rearing of horses and mules. It was once the seat of the Sp. court.

**Arany, János** (1817-32), after Petöfi the greatest Hungarian poet. He was b. at Nagy-Szalontá, of a Calvinist family. In spite of the hampering influence of his home he very early manifested promise of extraordinary talents. Intended by his father for the Church, he disappointed him and joined a company of strolling players. Vicissitudes fell upon his parents, and he returned, having secured a post at home as corrector. In 1840 he was appointed as notary, and married. His first work is a satire called the *Lost Constitution*, and was of a political kind. He became famous by winning 2 prizes from the Kisfaludy Society for which he ed. a translation of Shakespeare. During his residence at

Nagy-Körös, where he was prof. of Hungarian literature and language, he produced a quantity of poems in Magyar. His works include *Something about Association* and *On Hungarian National Versification* (both being dissertations on the technique of the Magyar ballad); *Death of Buda*, a prize poem; *Toldi*; *The Love of Toldi*; and *Toldi's Evening*, an epic trilogy.

**Arapahoes**, an Algonquin tribe of N. Amer. Indians, who formerly lived in the dist. between the S. Fork of Platte R. and the head-waters of the Arkansas. Later they withdrew into Colorado. They now number about 2000, and have split up into 3 divs.: the Hitunena, in a reservation in Montana; the N. A., in a reservation in Wyoming; and the S. A., in Oklahoma, who sold their reservation in 1892, and are now citizens. See Kroeber's *The Arapahoe*, 1904.

**Arapaima** (native Brazilian name), a genus of malacopterygious fishes of the family of Osteoglossidae, related to the salmon and herring. *A. gigas* is the largest fresh-water fish in the world, attaining 15 ft. in length. It is captured by spearing in S. America for exportation.

**Arapiles**, a Sp. vil. near Salamanca, celebrated as the site of the battle of Salamanca, in which Wellington defeated the Fr., 1812.

**Ararat**, a municipal tn. of Victoria, Australia. Its pop. is about 5000, and it is situated towards the W. extremity of the Great Dividing Range. It is the centre of the trade in grain and wool of the N.W.

**Ararat**, the highest point of Armenia. It rises to a level of 17,000 ft. It is situated in the plain of Aras. The mt. mass of A., rising from the Armenian plateau, consists of 2 portions, the Great and Little Ararat. Tradition makes it the resting-place of Noah's ark. The mt. is of volcanic composition, though no recent outbreak has occurred. The name also applies to the country of Urardhas, the country where the ark rested after the flood. The name is unknown to Armenians of the present day.

**Aras**, the Araxes of Xenophon, a riv. rising S. of Erzerum and flowing through the Erzerum prov. into the Pisan plateau. It has a length of 600 m. Its trib. is the Zanga. From 180 B.C. to A.D. 50 Aratanata was the cap. of Armenia and stood on an is. in the A.

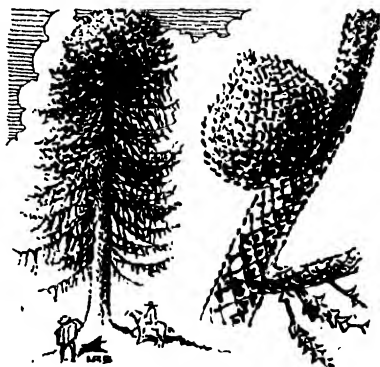
**Arasur Hills**, Bombay, famous for the shrine of Amba Bhavani. Mother Amba was apparently one of the gods of the pre-Hindu race taken over by the Hindus.

**Aratus** (271-215 B.C.), a Gk. statesman, b. at Sicyon. He was educated at A. Abantidas the tyrant put his father to death while A. was yet young. In 251 B.C. he overthrew Abantidas and commenced a very successful career. By joining the Achaean League he made it a great power against all tyrants. He eventually lost favour and was poisoned.

**Aratus** (315-245 B.C.), a Gk. poet contemporary with Theocritus. While residing at the court of Antigonus Gonatas

he wrote his celebrated astronomical poem *Phaenomena*, which was very popular in ant. times and was trans. into Lat. by Cicero. He d. in Macedonia. St. Paul's quotation in his speech to the Athenians (Acts xvii. 28) was from the *Phaenomena*.

**Araucanians**, or **Ancas**, the Indian natives of Arauco in Chile. The prov. lies between the Andes and the Pacific Ocean. They are unique as the only Indian people with a system of democratic gov. No actual laws are formulated, but discipline quite as rigorous is exercised by means of the influence upon their primitive, and therefore conservative minds, of custom and tradition. Formerly gov. rested in 4 *toquis* or princes, the chief of whom was the Great Tarqui. They hold a belief in an all-powerful being, but acknowledge the existence also of many spirits, both good and bad. They number about 102,000 (1933). The A. vigorously resisted the Sp. occupation, and made desperate but futile opposition to it.



ARAUCARIA

**Araucaria**, a genus of gigantic firs (Coniferae) found scattered over the S. hemisphere. Its leaves are stiff and broad; the scales of the cones bear a leafy appendage and the anthers are many-celled. *A. excelsa*, the Norfolk Is. pine, abounds in turpentine, and provides a heavy timber; *A. bidwilli*, the bunya-bunya pine, grows in Australia; *A. imbricata*, the monkey-puzzle, yields much resin.

**Arauco**, a maritime prov. of N. Chile. Its area is 2458 sq. m. and its pop. 56,000. Its nature is agric. and its cap. Lebu.

**Araunah**, the Jebusite owner of a threshing floor on Mt. Moriah, which David purchased as the site of an altar to Jehovah that the plague then raging might be stayed (2 Sam. xxiv.; 1 Chron. xxi.). The place afterwards became the site of Solomon's Temple. In Chron. A. is called Ornan.

**Araurá**, a tn. of Venezuela, S. America, situated in a fertile dist. producing cattle, cotton, and coffee. Pop. about 4000.



**Aravalli Hills**, a range of mts. in India running through Rajputana and Ajmere-Merwara. Its highest point is Mt. Abu (5653 ft.). The white appearance of the range is due to large quantities of quartz and not to snow.

**Araxas**, tn. of Minas-Geraes, Brazil, on the Ilho das Velhas, W. of the Matto Gordo Mountains.

**Araxes**, the name of sev. rivs.: 1. In Armenia, the modern Aras (q.v.). 2. In Persia, which flowed into a salt lake not far below Persepolis, which tn. stood on its banks. 3. The A. or Chaboras in Mesopotamia, which flowed into the Euphrates. 4. The A. of Herodotus. See Herodotus, i. 20.

**Arbaces**, a general of Sardanapalus, and king of Assyria. He founded the Median empire about 830 B.C. This is according to the very doubtful hist. by Ctesias. However, there are inscriptions of Sargon of Assyria, where mention is made of one Arbaku, a chief.

**Arbalest**, or **Arblast** (Lat. *arcuballista*, from *arcus*, a bow, and *βάλλειν*, to cast or shoot), a cross-bow. It was no doubt derived from the larger *ballistæ*, and was introduced into England by the Normans. See further under *Cross-bow*.

**Arbe** (*Rab*), an is. in the Adriatic. It forms the most northerly point of Dalmatia, Yugoslavia. It is 13 m. long and 5 broad, and has A. for its cap. The ruins of the bp. of Marco Antonio de Dominis, the celebrated philosopher (q.v.), are there. The prin. industries are fishing and silk. Pop. of is., 6000.

**Arbela**, an anct. tn. of Adiabene. During Assyrian times it was the cap. of the country between the greater and lesser Zaab. The modern tn. is populated mainly by Kurds.

**Arber**, Edward (1836-1921), Eng. scholar, D.Litt. (Oxon.), F.S.A., fellow of King's College, London, formerly Eng. examiner at London and Victoria (Manchester) univs., prof. of Eng. at Birmingham Univ. from 1894. He issued and ed. many valuable series of reprints, including *English Reprints*, 1868-1871; *English Scholar's Library*, 1878-84; *First Printed English New Testament*, 1871; *The First Three English Books on America*, 1885; *English Garner*, 1880-83; *British Anthologies*, 1899-1901; *The Term Catalogues*, 1903; *A Christian Library*, 1907. He was knocked down and killed by a taxicab in Kensington.

**Arbitrage**, a commercial term applied to the process of the equalisation of prices in different business centres by buying in the cheaper market and selling out in the dearer. It is mainly carried on between London, other European caps., and New York, and deals for the most part with stocks and shares, foreign exchange, and bullion. The profits of A. are small except in stocks, in which case the operation is attended with considerable risk.

**Arbitration** (in civil law) (Lat. *arbitrari*, to judge), a term which has come to us from Rom. law, and which is applied to a judgment given by a selected person or persons in some disputed affair. In

Rom. law we find in existence 2 forms of A., one compulsory and the other purely voluntary. As is the case in Eng. law, the arbitrators must come to a decision on all points submitted to them. A. as a method of judgment may be said to apply roughly to 3 different sets of circumstances: in civil law, in international law, and in the settlement of labour disputes.

The mode of proceeding to A. is by 'a submission' or 'reference' to 'arbitrators' or 'referees,' who then proceed with due consideration of 'equity' to give their 'award.' This manner of the settlements of disputes has been supported and encouraged in England for some very considerable time, and many Acts of the last century provided for the use of A. in many cases of dispute which would otherwise have come under the jurisdiction of the civil courts. Almost all civil cases can be submitted to A., and seldom when an award has been given by A. has it on some technical point been set aside. Breach of contract, breach of promise cases, property disputes, slander actions, trespass actions can all be submitted to A. In 1889 the A. laws of England, so far as procedure is concerned, can be said to have been practically codified. A matter which is clearly illegal and contrary to the public weal cannot be referred to A., since it is obvious that from motives of public policy and safety such matters must be punished for the public good. Any one who is capable of making a contract may be said roughly to be capable of making a reference to A., and, on the other hand, persons incapable of making a contract cannot make reference to A. It has also been held that reference to A. made by a lawyer for his client must stand good. In the choice of an arbitrator the parties at difference are absolutely free, they may choose practically whomsoever they will, and provided that the person chosen is not incapable of making sane judgments, the choice will be upheld by law. It is customary, however, to choose as an arbitrator a person capable by training of examining evidence, or a person who is familiar with the subject under A., e.g. in naval matters a seafaring arbitrator would usually be chosen. In most ordinary cases of A., however, a lawyer is usually chosen. All these rules apply to voluntary A. A court or judge, however, may put any point arising in any case to compulsory A., when the award of the arbitrators may be enforced as the judgment of the court.

**Arbitration Act of 1930.**—This Act is a corollary to the Arbitration Act of 1889, in that it carries further the constantly increasing desire of Parliament to aid and encourage private A. Its enactment resulted from the requirements of international trade and it was passed in consequence of resolutions discussed under the auspices of the League of Nations. It was in 1923 that the League Assembly promulgated a Protocol on Arbitration Clauses, recognising submissions to A., and effect was given to that protocol

by the Brit. Gov. in the Arbitration Clauses (Protocol) Act, 1924. The next step in the raising of the status of private A.s. was the Geneva Convention on the Execution of Foreign Arbitral Awards which the Brit. Gov. accepted in 1927. The Act of 1930 was passed to give effect to that convention. The vital provision of the Act is the second section, which declares that a foreign award may be enforced in England either by an ordinary action at law, or, as a judgment or order, under the Act of 1889, thus placing foreign awards on as sure a foundation as Eng. awards, so far as recognition and enforcement by Eng. courts are concerned. But the aid of our courts can be invoked only if one at least of the parties concerned is a subject of a power which has made reciprocal provisions to enforce foreign awards, as declared by Order in Council, or if the award was given in a ter., e.g. a colony or protectorate, which has received similar recognition by Order in Council.

**Arbitration, Industrial, or A. in labour disputes.** This A. usually takes place between representatives of the employers and of the employed, although frequently an independent arbitrator is appointed. The whole position of A. in its labour sense was a purely voluntary one until the year 1896, when legislation was passed placing it on a legal footing. Previous to this, however, A. and A. boards had been estab. in almost every trade in the country.

The Conciliation Act of 1896 repealed all previous legislation, and, supported by the fact that a coal dispute had been settled by Lord Rosebery in 1893 and a cab drivers' dispute by the home secretary in 1895, stated that in cases of dispute between employer and employed meetings might be held with an independent chairman, or a chairman appointed, on application, by the Board of Trade. By the formation of conciliation boards by the president of the Board of Trade (Mr. Lloyd George), a railway strike which broke out in 1910 was temporarily averted. In 1912 compulsory conciliation boards were set up by the Conciliation Bill which helped to end the coal strike of that year. These boards were to have independent chairmen elected by a given date, failing which they were to be appointed by the Gov., or they could, on application, be appointed straight away by the Board of Trade. These conciliation boards were to fix the wages which had been in dispute during the coal strike. In the U.S.A. about 30 states have made constitutional or statutory provision for mediation in trade disputes. Federal legislation may not touch the question of A. and conciliation save as regards disputes affecting inter-state commerce.

**The Industrial Courts Act, 1919.**—The Conciliation Act of 1896 combined with the Industrial Courts Act, 1919, represents the characteristic Brit. form of the system of settlement of industrial disputes by conciliation and A., with its emphasis on voluntary or optional

resort to investigation, conciliation, and A. by competent tribunals. Voluntary recourse to these methods, with or without encouragement or assistance from the Gov., has now been a long-established practice in all the well-organised Brit. industries; while trade boards supply the need in the less well-organised and unorganised industries. In some Brit. dominions, however, the principle of Compulsory A. has been adopted, and the legislation of most of the Australian states has been modelled upon it. Italy, too, under the Fascist gov. of Mussolini, adopted a compulsory A. law which absolutely forbade stoppages of work. The tendency towards compulsion is not otherwise very pronounced. In the First World War compulsory A. was adopted by the Munitions of War Acts, 1915-17, which provided for settlement of wage disputes by a committee of production, a court of A., or a single arbitrator. This system was continued for a time after the war by the Interim Wages Act, but in 1919 compulsion in the United Kingdom was abolished by the Industrial Courts Act, which estab. a standing industrial court of independent persons and representatives of employers and workpeople, to deal with such disputes as might be referred to it, with the consent of both parties, or to investigate the circumstances surrounding a dispute if the minister of labour, with or without the consent of the parties, deemed inquiry to be desirable. In its original form this measure contemplated compulsory A., and went so far as to make trade union funds liable for strikes against the decisions of the arbitrators, but in its accepted form neither the awards of the court nor the findings of an inquiry are made binding upon the parties. Thus the tradition of voluntary resort to A. is perpetuated, the only significant departure being the extension of the power to order an inquiry into the circumstances of a dispute at the minister's discretion. The act lies on the border line between A. and conciliation in that it partakes of the nature of both. But the statutory power given to the minister of labour with respect to investigation is not adequate, in that it is left entirely to his discretion to order an inquiry, and gives the court no power to compel production of documents and witnesses. Elsewhere, important changes in the machinery of conciliation and A. have been introduced by all the larger countries of the world since 1920.

In some countries the arbitral body itself exercises the initiative, e.g. in Canada, under the Industrial Conditions Act, 1919, of Manitoba, a joint council of industry was set up of 5 persons, 2 each representing employers and employees, with an impartial chairman, with the assistance of technical advisers appointed by the lieutenant-governor. This body can take the initiative in investigation of conditions affecting wages, including cases of alleged unfair profits through low wages, cost-of-living inquiries, and so forth.

While experience on the whole seems to strengthen the traditional Brit. method of voluntary conciliation and A., it also tends to confirm the view that in some authority should be vested the power ultimately to compel inquiry, and that the investigating tribunal should be of such a character as would guarantee its permanence and the continuity of its operations. These at all events are inferences which suggest themselves by the light of the settlements of trade disputes in Australia. But, in the United Kingdom, progress was prejudiced by the general strike of 1926, the rancour of which led to a reform in another direction altogether, there being ground for supposing that the free will of the work-people was not consulted before their leaders provoked the strike. (See TRADES DISPUTES ACT.)

**Arbitration, International.**—An act by which 2 nations agree to submit their differences to 1 or more persons, and to agree to their award after both the parties at difference have had an opportunity of being heard. If the arbitrator is an emperor, a king, or president of a republic he is not expected to act in person, but to delegate his authority to a chosen board of arbitrators. Further, the award of a board of arbitrators is not enforceable, as is the award of an enforced A. of civil law, but rests entirely upon the faith and honour of the parties submitting their case to A. It is usual also to appoint an odd number of arbitrators, and to abide by the decision of the majority in case a unanimous agreement is not arrived at.

International A. has to deal not only with questions of law, but also with questions of fact. Usually, however, when a point of law has to be decided, the case is referred to a court of A., which gives an 'award' as in the case of civil law. But frequently cases of frontier questions and pecuniary liability have to be decided, and in that case a 'mixed commission' usually hears the case, i.e. a commission composed of representatives from both or all sides. In the 2 decades immediately preceding the First World War international A. was used frequently by many nations. Great Britain figured in the greatest number of cases, being followed by the U.S.A. and France. The subjects in dispute may be roughly described as differences over the ownership of land or of fishing rights, and pecuniary losses caused by the wrong action of another State. Among the most important cases submitted to A. in the earlier years were the Alabama case, the Bering Sea controversy, and the long-drawn-out case of the fishing rights of the Fr. off the coast of Newfoundland, which was settled in 1904, and which had dragged its slow length along since 1711. A permanent court was estab. at The Hague in 1900 to which many important cases have been referred. The Hague Court of A. was the realisation of an old ideal dating back to the eighteenth century, and was the immediate outcome of a peace confer-

ence called by the tsar of Russia in 1899. Sixteen of the powers agreed to the appointment of a court which should be open for the settlement of all disputes amongst nations. The court was to be composed of men learned in international law and appointed by the signatory powers. The aim of the court was obviously the furtherance of the peace movement by the submission to this permanent court of all disputes from which war might arise. Probably its most important decision was given in the case of Great Britain, Germany, and Italy versus Venezuela. On that occasion it may have prevented war, and certainly allayed the spirit of hostility which had arisen from the Venezuelan question.

**A. between Great Britain and the U.S.A.**—It is to be observed that long before there was any world court of justice or a Hague court, Great Britain and the U.S.A. were distinguished among all the nations for their readiness to submit differences to A. rather than resort to arms. One of the most famous cases between the 2 nations was that known as the Alabama case. (See under ALABAMA, THE.) The most serious difference between America and Great Britain in modern times occurred during the second administration of President Cleveland. There was a dispute between Venezuela and Great Britain over the boundary between Venezuela and Brit. Guiana. Secretary of State Richard Olney of the U.S.A. intervened in a dispatch to the Brit. Gov. which brought relations between the 2 countries almost to the breaking point. The crisis was allayed by the judicious policy of Lord Salisbury, then Brit. Prime Minister, and the matter was submitted to A. and settled some years later. Other prominent cases in which the U.S.A. and Great Britain were involved and which were settled by A. were the boundary dispute between Alaska and Canada in 1903; and the N. Atlantic coast fisheries dispute which was settled in 1910 after causing difficulty for over 60 years. Not only did the 2 countries thus set an example to the world, but they emphasised it by signing a treaty of A., Aug. 3, 1911, and again on Sept. 15, 1914, when they signed an Anglo-Amer. Peace Commission treaty. In so far as human promises can avail, the 2 great Eng.-speaking nations have thus abjured all thought of war between them and have solemnly decided that any and all disputes between them shall be settled by peaceful A.

**A. and the First World War.**—It affords food for melancholy reflection that A., the solvent of international differences of no insignificant character, such as the Venezuelan boundary question, should have played next to no part in the First World War. Its voice was not, however, altogether silent, though sometimes the voice was hypocritical. Three successive Ger. chancellors, Bismarck, Holweg, and Hertling, were constantly advertising their desire for a peace by negotiation and bemoaning the Allies'

lust of conquest. The year 1917 was favourable to such 'defeatist' policy. Terrible battles—Arras, Verdun, and Ypres—had yielded nothing definite to the Allies in exchange for the great carnage. The moment was propitious, from the Ger. point of view, for encouraging a movement in the allied countries for a 'negotiated peace' as opposed to a 'peace through victory.' Behind this movement were many and diverse elements of no negligible character—the international financiers, who, rightly or wrongly, feared that credit all round would founder in the chaos of Socialism, the Socialist groups, the pacifists, certain ecclesiastics, and some of the old diplomats. The movement took shape in a proposal for a conference at Stockholm; but the conference proved a complete failure (see STOCKHOLM CONFERENCE). In the same year, too, the Catholic Church put forward a special plea for peace in which Pope Benedict XV., in outlining in his note (Aug. 1, 1917) his ideas of the bases calculated to ensure an enduring peace, proposed *inter alia* the 'settlement of all international disputes by A.' (see BENEDICT XV., POPE). The central empires loudly supported this substitution of the 'moral power of right' for material force, but said nothing of the restoration of conquered ter. The Allies left President Wilson to reply, in characteristic vein, that the action of the existing Ger. Gov. rendered nugatory any negotiations with them.

The moral to be drawn from this and similar failures is not that A. is necessarily a hopeless expedient, but merely that its voice is unlikely to be of any avail after hostilities have begun. The foundations of international relationships must be reconstructed if A. is to prove a more effective preventive of war than hitherto. In the Covenant (q.v.) of the League of Nations, a laudable if ill-fated effort, largely inspired by President Wilson, was made to strengthen A. as a means of composing international differences. The members of the League agreed that 'if there should arise between them any dispute likely to lead to a rupture' they would submit the matter either to A. or to inquiry by the council of the League, and that they would in no case resort to war until 3 months after the award of the arbitrators on the Council's report. An award had to be made within a reasonable time and a report by the Council within 6 months of submission. The League members also agreed that whenever any dispute arose between them 'which they recognised to be suitable to A. and which could not be satisfactorily settled by diplomacy,' they would submit the whole subject-matter to A. Disputes as to treaty interpretation, any questions of international law or as to the existence of any fact which if proved would constitute a breach of international obligation or as to the reparation for any such breach, were declared to be matters generally suitable for submission to A. The court of A. to which a case would be referred would be the court agreed

on by the disputants or stipulated in any convention existing between them. Finally, the members agreed that they would carry out in good faith any award made, and would not resort to war against a member which complied with the award; and in the event of any failure to carry out an award, the Council would propose what steps should be taken to give effect to it. Experience was to show, however, that in any really serious contingency the covenant was nugatory. See further under COVENANT OF THE LEAGUE OF NATIONS; LEAGUE OF NATIONS.

A. since 1922.—After the establishment of the Court of International Justice in 1922 the advance which took place in regard to A. in the ensuing 5 years was in 3 directions: in the actual work of the Permanent Court; in the number of special A. treaties concluded by individual Govs.; and, finally, in the general trend of the debates in the plenary sessions of the eighth assembly of the League of Nations. The court's intervention in a dispute between 2 or more govts. might be secured either for the interpretation of treaties, where specific provision for such reference to the court had been made in advance by the parties; or for the settlement of all justiciable disputes referred to it by both parties; or by one party only if both had accepted the optional clause of the Statute of the court (see OPTIONAL CLAUSE); or for an 'advisory opinion' upon any dispute referred to it by the council or assembly. 'Opinions' have been given on a dispute between France and Great Britain as to the nationality (and consequently liability to military service) of Brit. subjects in the Fr. protectorate of Tunis; in disputes between Poland and Germany in 1923, as to the nationality and the rights of Ger. residents in dists. ceded to Poland under the treaty of Versailles; and in the interpretation of the treaty of Lausanne (q.v.) regarding the sovereignty of the dist. of Mosul—a most important question (see IRAQ). The court's jurisdiction has (theoretically) the court still, no doubt, continued to exist throughout the Second World War) also been invoked in other ways, e.g. in the case of the *Wimbledon*, which raised certain questions of interpretation of the transport clauses of the treaty of Versailles arising out of the closure by Germany of the Kiel Canal to a Brit. vessel chartered by a Fr. firm to carry munitions to help Poland against Russia. An instance of a case of reference by the consent of both parties or by one party relying on the optional clause is afforded by the agreement in 1924 by Greece and Bulgaria to invite the court's interpretation of the treaty of Neuilly relative to a frontier dispute; and in the same year Belgium invited the 'compulsory' jurisdiction of the court against China in the matter of the denunciation of the Sino-Belgian treaty of 1865, relying on the optional clause, which both had accepted; and also by the *Lotus* case, submitted by France and

Turkey in 1926, an important case raising a pure question of customary international law arising out of a collision between a Fr. and a Turkish vessel with resultant loss of life. The readiness of both France and Turkey to submit so important a decision to the court was some indication of increasing confidence in that tribunal, and the great increase in the number of A. treaties—at least 90 were negotiated between the end of the First World War and 1926, a number much larger than all the treaties concluded during the nineteenth century—was another tribute. Thus far the progress of A. was good, but when the sessions of the eighth assembly of the League began, it was appreciated that the leading Govs. of Europe were not prepared to pledge themselves further in regard to A. until more substantial advances had been made in the sphere of security, while the Brit. Gov. showed so little sign of changing its attitude towards the optional clause that the Imperial Conference of that year declared the time premature to accept the obligations of that famous clause. In the Brit. case against Albania on the mining of the Corfu Channel, the majority of the United Nations Security Council upheld (March 1947) the Brit. charges against Albania of laying mines in the channel, but the Russian delegate used the veto and there was no decision. Britain therefore applied to the International Court of Justice, which tribunal (March 1948) rejected by 15 to 1 Albania's preliminary objection that in view of Britain's application being unilateral the court had no competence in the matter. (See further ARMAMENTS, LIMITATION OF.)

Consult *From Paris to Locarno and After*, by Fred Alexander, 1928.

**Arblast**, see ARBALEST.

**Arboga**, an anct. tn. of Sweden, in the former *tan* of Vestefås, situated on the R. A. and canal which connect Lakes Hjelmar and Mälär. Formerly a place of considerable trade, especially in woollen and iron wares, its prosperity has greatly declined. Once important, too, as the seat of many councils and diets, particularly the parliaments of 1434, 1440, 1471, and 1501. The tn. gives its name to the coinage of 1625 and 1627, which consisted of *klippingar*, or square copper pieces, and *fyrkar*, or farthings. Pop. 3000.

**Arbogast**, a barbarian officer of the Rom. army at the end of the fourth century. His nationality is obscure, but the authorities, among them being Zosimus and Sulpicius Alexander, give it as Frank. He served with distinction against the Goths, and was sent against Maximus, whom he totally defeated in A.D. 388. He then became the chief minister to Valentinian II. The death of Valentinian, who had opposed barbarian progress, led A. to select as a successor one Eugenius, a rhetorician. A battle against Theodosius saw A.'s defeat. He escaped, only to kill himself 3 days later, while Eugenius was executed.

**Arbois**, a tn. of K. France in the dept. of

Jura on the Cuisance. Produces good red and white wine and possesses a tannery, saw-mills, and paper and oil industries. Pop. 3000.

**Arbon**, a Swiss tn. in the canton of Thurgau, situated on Lake Constance, Pop. about 3000.

**Arbor Day** is a day set apart for the public planting of trees in America. The custom originated in Nebraska in 1872 and gradually spread throughout the continent. With few exceptions it is regarded as a legal and public holiday. The date is movable and fixed by proclamation. The same custom is observed in New Zealand.

**Arboriculture** (Lat. *arbor*, tree, *cultura*, cultivation), the scientific cultivation of trees, whether ornamental or useful. In the cultivation of fruit trees such processes as grafting, pruning, and binding are employed; viticulture, or vine-growing, is common to France and S. Europe. For sylviculture, or the growing of forest trees for timber, see FORESTRY.

**Arbor Low**, megalithic structure near Bakewell, Derbyshire. A circle of 30 stones, now overturned, enclosing a megalithic ruin, is surrounded by a fosse and rampart 250 ft. across. It is of late Neolithic age.

**Arbor Vitæ** (Lat., tree of life), a Chinese and an Amer. species of *Thuja* of the order Coniferae. *T. orientalis* is the name of the former, *T. occidentalis* of the latter. The leaves are small and wrap round the stem closely.

**Arbroath**, or **Aberbrothock**, a seaport of co. of Angus, Scotland. It is situated upon the mouth of Brothock Water. It is under the administration of a provost, assisted by bailies and a council. Its chief industries are the manuf. of sail-cloths, canvas, the tanning of leather, boots, bleaching, engineering, chemicals, and extensive fisheries. Pop. 20,000.

**Arbroath Flags** are grey flagstones and grey and olive shales found almost exclusively in Angus, Scotland.

**Arbuthnot, Alexander** (1538-93), a Scottish ecclesiastic and poet. He was educated at St. Andrews and later at Bourges. In 1569 he was installed principal of King's College, Aberdeen. This post he filled till his death. His existing works are: *Praises of Women*; *On Love*; *Miseries of a Poor Scholar*.

**Arbuthnot, John** (1667-1735), physician and satirist, b. at Kincardineshire, studied at Aberdeen, Oxford, and St. Andrews. Appointed regular physician to Prince George and, in 1705, to Queen Anne. Became the cherished friend of Swift and Pope and himself gained a reputation as a wit. A. was the chief contributor to *Memoirs of Martin Scriblerus*, 1741, part of which was by Pope. His other prin. works are (1712) *The History of John Bull*, mainly against the duke of Marlborough; *A Treatise concerning the Altercation or Scolding of the Ancients*; and the *Art of Political Lying*, the style of which is modelled on Swift, but without the latter's ferocity. A. was an honourable

and amiable man, one of the few who retained the sincere regard of Swift.

**Arbutus**, a genus of evergreen shrubs of the order Ericaceae, occurring in Europe, the E. and N. America. *A. unedo*, the strawberry-tree, mentioned by Virgil, bears a berry which resembles the strawberry. *A. andrachne* is the oriental A.

**Arc** (from Lat. *arcus*, a bow), a portion of a curved line. The straight line joining its extremities is called the chord. The length of an A. of a circle can be determined if the angle subtending the A. at the centre and the radius or circumference are known. If  $r$  is the radius, the circumference =  $2\pi r$ , where  $\pi = 3.1416$ . Then if  $a$  be the angle subtending the A., the length of the A. is  $\frac{a}{360}$  of the circumference.

The electric A. is the electric discharge between 2 carbon terminals at different potentials. It is utilised for lighting purposes in A. lamps, and for soldering and fusing purposes where an extremely high temp. is required.

**Arc**, Joan of, see JOAN OF ARC.

**Aroa**, an anct. tn. of Phœnicia which contained the temple of Aphrodite Astarte. It was the bp. of Alexander Severus, from whom it took the name of Cæsarea Libani.

**Arcachon**, a coastal tn. of S.W. France in the dept. of Gironde; is celebrated for the magnificent pine woods in the vicinity. There are 2 divs. of the tn., the summer part on the beach, and the winter portion inland. The climate is very mild, and many consumptives use it as a winter resort. The chief industries are oyster-breeding and fishing. Pop. 10,000.

**Arcade**, a range of arches supported either by piers or columns. The earliest known examples are those of Tabularium, the theatre of Marcellus, and the Colosseum at Rome. In some a gallery runs behind the supporting pillars, in others they are part of the wall. The latter are called blind or wall As. and are common in Eng. churches.

**Arcadia**, the central plateau of Peloponnesus, Greece. It is surrounded by mt. barriers, and suffered stagnation on account of the difficulty of establishing communication with surrounding countries. The anct. inhab. were shepherds and hunters whose gods were Pan, Hermes, and Artemis. It played a fairly important part in Gk. hist., as it is placed between Sparta and the Isthmus. A popular idea of the mode of Arcadian life attributes to them perfect happiness evinced by the absence of all that is called mundane in modern cities. Simple diet and an absolute ignorance of immorality aid this idyllic conception of the Arcadians.

**Arcadius** (A.D. 378-408), Rom. emperor and son of Theodosius the Great. He succeeded his father at the same time as his brother Honorius, and the kingdom was divided between them. Both displayed small governing ability, and it speedily passed to other hands.

**Arcadius**, a Gk. grammarian of the second century, a native of Antioch. An epitome of the works of Herodian has been attributed to him, but without authentic proof.

**Arcagnolo, L'**, or Clone, see ORCAGNA. **Arcani Disiplina**, a theological term applied to the custom, which prevailed in the early Christian Church, of regarding certain rites as intimate mysteries, to be carefully kept from the heathen and even from those who were receiving instruction in the faith. The term was not in use till the seventeenth century, in which much was written *de disciplina arcani* on both the Catholic and the Protestant side.

This practice was based on Matt. vii. 6, 'Give not that which is holy unto the dogs, neither cast ye your pearls before swine,' and on 1 Cor. xiii. 1, 2. 'The doctrines of the Holy Trinity, baptism, and the eucharist were especially withheld from the knowledge of the uninitiated. This practice of reserve prevailed about the third century, and was well estab. in the fourth and fifth. The writers who set forth the idea are Origen, Basil, Athanasius, Chrysostom, Theodoret, Ambrose, Augustine, and others. Many early writers refer to it, and veil their meaning so that only the initiated may understand. The creed was only formally delivered to the catechumen at his baptism, and was, therefore, regarded as a mystery. The Lord's Prayer, likewise, was jealously kept from the heathen, because of its prominence in the communion office. The reason given for this secrecy was that all converts were not sincere, and that the early Church was obliged to be jealous of her doctrines for fear of the misinterpretation and persecution to which she was subjected.

**Arcanum** is the neuter of the Lat. adjective *arcanus*, used as a substantive. It had the significance of a profound mystery, or, in a more particular sense, one of the alchemist's secrets of nature, such as the elixir of life, the philosophers' stone, etc. The plural form *arcana* is also used, sometimes as though it were a singular noun.

**Arcè**, an It. com. in the prov. of Caserta; pop. 7500. The tn. of A. is near Arpino, and has a pop. of 2000.

**Arcesilaus** (316-241 B.C.), Gk. philosopher, and founder of the Middle Academy. He was b. at Pitane in Æolis, and was educated by Autolycus, and later at Athens by Theophrastus and Crantor. He left no writings.

**Arcèvia**, a tn. of Ancona, Italy, on the Marches, 29 m. S.W. of Ancona; pop. 15,000 (1931).

**Arch**, a structure of stones or other hard blocks arranged in curves over an open space, so that the individual blocks may be supported by their mutual pressure and thus be enabled to sustain a superincumbent load.

The sides of an A. are termed *haunches* or *flanks*, the blocks of which it is composed are called *voussures* (B). The lowest voussours are called *springers* (C),

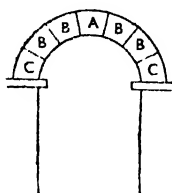
and the highest is called the *keystone* (A). The inner curve is termed the *intrados*, and the outer curve the *extrados*.

In building an A. it is necessary that a temporary structure should be erected in the open space to serve as a support to the vousoirs until the keystone is put in place. Semicircular frames of timbering are generally used in modern building for this purpose.

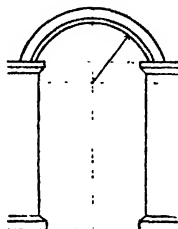
The A. was utilised by the ancients, Assyrians and Egyptians, but was not generally employed by the Greeks, who

contra-flexed. The Tudor A. is a 4-centre pointed A., and is the leading characteristic of the architecture of Tudor mansions and churches in this country. Foliated As. imitated in their form the shapes of leaves, and are classified according to the number of folis, as trefoil, cinquefoil, and polyfoil.

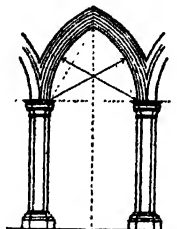
Arch, Joseph (1828-1919), an Eng. politician and founder of the National Agric. Labourers' Union. He was b. at Barford, Warwickshire. Justin McCarthy calls him the 'emancipator of the agric. labourer.' He represented



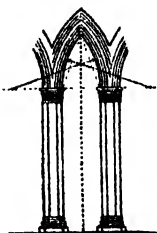
ARCH: VOUSOIR, SPRINGERS, AND KEYSTONE



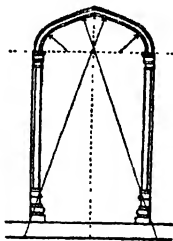
SEGMENTAL



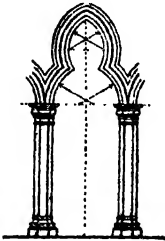
EQUILATERAL



LANCET



TUDOR



POINTED TREFOIL

maintained the tradition of the straight line in their architecture. Rom. As. were usually semicircular, though segmental As., that is, where the centre of the curve is below the springers, were not uncommon. The pointed A. appears to have been adopted by the Muslims as an emblem of their faith, and it made its way into Europe through the example of their own building and the ideas brought westward by the returning crusaders. It was used in Gothic architecture in various forms, the simplest of which are the equilateral pointed A., where the centres are at the foot of the springers; the drop A., where the centres are within the archway; and the lancet A., where the centres are outside the archway. In the Fr. Flamboyant period the elliptical A. with 3 centres became common, as also did the ogce A. with 4 centres, the upper curves being

the N.W. div. of Norfolk in the Parliaments of 1885 and 1886; and he was returned again in 1892 and 1895. He retired to Barford in 1900.

Arch, Triumphal. In order fittingly to celebrate the victorious return of Rom. generals, an A. was erected either across roads or at the entrance to cities. The first known T. As. were those erected by L. Stertinius in 196 B.C. He erected 2 in the Circus Maximus and the Forum Boarium respectively. During the reigns of the Rom. emperors they received much attention, and lavish expenditure of money and every device of art was brought into play to add to their splendour. Frequently they were decorated with bas-relief designs and adorned with laudatory inscriptions. The total number of T. As. that were built by the emperors is about 40, of which number 3 remain standing.

These were built respectively by Titus in A.D. 82, Septimius Severus in A.D. 203, and Constantine between the years A.D. 306 and 337. Variations of these forms of masonry exist in other parts of the old Rom. empire. They are found at such places as Rimini, Susa, Verona, Ancona, and Orange (France).

Inspired by a similar motive, Napoleon resolved to adorn Paris with 4 of these structures. In 1806 he caused to be erected the Arc de Triomphe du Carrousel. It is situated between the Louvre and the Tuileries, and has been constructed after the pattern of the A. erected by Septimius Severus. In the same year another A. was commenced beyond the Champs Elysées. This is the Arc de Triomphe de l'Etoile. Its erection, however, suffered some hindrance, and was not completed till 30 years after. In 1871 the Ger. army marched under it on their entrance into Paris. Modelled upon the style of the A. erected in Rome by Constantine was the Marble A. of London. Originally it was situated at Buckingham Palace, but in 1851 it was transferred to Hyde Park. George III. was responsible for the idea of its construction. The expense involved amounted to over £30,000.

**Archæan System** (Gk. ἀρχαῖος, ancient), in geology, the lowest system of stratified rocks, below the Cambrian system. Other terms proposed are *Pre-Cambrian*; *Azoic* (without life), because it is believed that no fossils occur in it; and *Eozoic*, on the assumption that a structure called *Eozoon* is really a fossil. The A. S. is one of great complexity; it consists of a mixture of igneous rocks with stratified rocks, many of which have been metamorphosed. The most important constituents are gneisses and schists, whilst the presence of animal or vegetable life is indicated by masses of carbonaceous shales. The A. S. is understood to underlie the younger formations in every part of the globe, and it is estimated that in places it attains a thickness of from 80,000 to 100,000 ft. There are outcrops in the N.W. of Scotland; the Wrekin in Shropshire; over a great part of Canada; in Michigan and Minnesota in the U.S.A.; in Scandinavia, Brittany, Bavaria, and the Pyrenees in Europe; in Tasmania and New Zealand; in N. China and Japan; and probably over a great part of Canada. The rocks often yield minerals of great value, including iron, gold, silver, copper, nickel, and sometimes precious stones. See Sir A. Geikie, *Text-book of Geology*, 1882.

**Archæology**, the study of antiquities. The progress of knowledge has varied the nature of the application of the word to all anc. branches of study, as it was once used only to signify the study of the art of Greece and Rome. The range is extremely wide and covers vast ground, for it embraces practically the whole of the hist. of races and things from the beginning of hist. to the Middle Ages. So many fields of study are closely associated with A., e.g. geology, palæ-

ontology, palæobotany, that it is necessary to establish a dividing line between encroaching subjects and to confine the term A. to the artistic element found in remains anc. and mediæval.

A. may be said to have commenced with the end of the Quaternary period of geology. Controversy has been waged upon the question whether distinct evidences in flint and stone implements place the source further back, into the Tertiary period. The main difficulty which seems to arise is that of discrimination between chips of rocks formed by nature in the crumbling processes of earthquakes, denudation, etc., and actually artificially formed weapons. It is certain, however, that in order for man to possess the necessary skill exhibited in the Quaternary flint implements, he must have passed through a previous and necessarily less skilful stage. Evidences of this period have been claimed to exist in the Plateau-gravels of Kent, Belgium, and Egypt, and the term *colithic*, meaning 'dawn-stone,' has been applied to them.

With the Palæolithic period evidence of a more dependable character is found. Corresponding characteristics in the flint remain, and the beds in which they are found point to the similarity of age of both the bed and the deposit, hence this evidence is almost purely geological. During the Tertiary period the contour of Europe was very different from that of the later Quaternary period. Practically all the area N. of a line drawn from S. England to Leningrad was sea, and the climate existing over the area was of a mild character. The great change came, with its enormous upheavals resulting in the appearance of the Alps, Carpathians, and Caucasus. The whole level was raised and the great mt. systems, with their capacity for condensing, caused the Pluvial period. Moreover, further phenomena which resulted were the appearance of glaciers, powerful agents of denudation and defacement, and increasing cold towards the N. Acting with these gigantic forces were the great riv. systems of Europe, and thus it is that we find such a depth of bed, worn to its extent by the erosive nature of its progress.

The earliest recorded Palæolithic implement was probably found towards the end of the seventeenth century, and it supports the incontrovertible fact that the Thames has changed its bed for one now much narrower than the old.

The study of cave remains is comparatively new. It dates from the beginning of the eighteenth century. In the now-famous cave at Gailenruth in Franconia many remains were found by the archæologist of mammoths and like extinct animals, but it was not until 1842 that the search for evidences of man's contemporaneity with them was begun. The proof was found in Kent's Cavern, Torquay, by the Rev. J. McKnery. The peculiarity of the strata in this cave led experts to find that, fortunately enough, traces existed of man's occupation of the cave through all the varying periods as



far even as the medieval stages. Endeavours to fix the enormous intervals of time that must have lapsed between the different occupiers have varied in hundreds of thousands of years, sufficient evidence of the futility of the attempt. From the caves of France important discoveries have yielded specimens of primitive portrayal of animals upon stone and clay vessels that stand far above all contemporary evidence for remarkable skill in their intelligent execution. To gauge the quality of the intellect of the human mind at this period, it would assist to compare it with the Australian black or Fuegian. The best known of these engravings, that of a mammoth on ivory, is in the Jardin des Plantes, Paris. The attempt is extraordinarily rich in cleverness of perception. The presence of prehistoric man in the Arabian desert was, in Dec. 1932, quite definitely established by the finding round Kilwa in Transjordan of rock drawings which go back to the Palæolithic or Neolithic periods. These drawings evince artistic skill, and must have been known to the Christian inhab. of Kilwa, for they had built 2 lime kilns on the hillside below some of the pictures. In the Middle E., Palestine has also been a fruitful source of valuable finds, the work of Prof. Flinders Petrie and Prof. Garstang in the vicinity of the site of Jericho and Mount Carmel being especially notable. A series of caves was discovered in 1934 on Mount Carmel by Brit. and Amer. excavators which show continuous human occupation from 100,000 years ago, up till biblical times, and so through the Arab period to the date of discovery. While the line delineations of these cave-men possess such striking accuracy of touch, scarcely less true and faithful are their sculptured objects. How such a standard of art could exist within minds of such poor development comparatively, is a question which remains unsolved. Among the difficulties which beset the students of A. are the numerous attempts at fraud which have been made from time to time. Many of the perpetrators have not only had the audacity to spend considerable care and time in the manufacture of false evidences, but have produced works on their 'discoveries' supporting their claims to scientific recognition.

At the end of the Palæolithic period a break in the hist. of man in Europe occurs, and the next traces are those of the Stone Age. The structure and form of the country he inhabits are those familiar to us at the present day. New accomplishments appear, among which are the use of animals for domestic purposes, agriculture, and pottery, besides the significant mastery of weaving. More questions arise here as to the disappearance of the Palæolithic man before the advent of the Neolithic, but the questions remain unsolved.

Traces of Neolithic man are found mostly in the barrows of Wiltshire, Gloucester, and Dorset. They are called long barrows for they were succeeded

by round barrows. Some of the long barrows contain a stone chamber within which interments of the dead took place, and it is here that evidence of the burial of the dead is found. In some cases the burial process has been preceded by cremation, in others no cremation has taken place, and in fact, from sufficient evidence, it has been proved that decay has often set in before the burial took place, a practice which is prevalent among many present-day savages. The use of flint for implements of cutting was still appreciated, and mining of the stone took place very largely. Flint shafts have been found at Grime's Graves in Norfolk and Cissbury in Sussex. Two shafts were sunk and connected afterwards at the bottom by a gallery. Sites of the factories for the making of flint tools are found also in Kent, in Antrim, Ireland, and in Spiennes in Belgium.

It may be assumed that at this stage of human hist. man occupied most of the temperate parts of the world, an area covering the greater part of the earth's surface between the poles, and from the deductions made from discoveries in many places the theory of stone preceding the use of iron for tools is supported by them. In Japan extensive 'kitchen middens' have been found to contain numbers of chert implements, together with types of primitive pottery; the use of metal has been found to follow in order. The same system has been found in the Far E. In China fewer opportunities of exploration have been available, owing to hostile superstition damaging the monuments that mark their progress. Evidences, however, have recently been discovered of a prehistoric Neolithic culture in China. It has also been proved beyond a doubt that the same development from stone to iron marked the hist. of the Negro and Bantu races of Africa. In S. Africa, Egypt, and Somaliland large numbers of stone implements have been found.

In isolated countries like those of Scandinavia and Switzerland the hist. is clear; the former was free from interruption because of its isolated position, while the latter, protected by its mts. from disturbing peoples, enjoyed a similar peace. There are many mighty relics of the Stone Age which are still in a good state of preservation, and among them the most notable are huge circles of stone. To these monuments countless superstitions have lent themselves. In England Avebury and Stonehenge are 2 of the most remarkable survivals to be seen in W. Europe (see also ARBOR LOW). At the latter the conclusion has been drawn that the stones were raised for the purpose of religious celebrations in the times of the Druids, and many stone implements in the form of hammers have been found buried on the site. Astronomical reasons have been assigned for the erection of the Stonehenge monoliths, notably by Sir Norman Lockyer. Stonehenge is now

assigned by archaeologists to the early Bronze Age.

The appearance of the Bronze Age may be said to date from 3000 B.C. in Crete, 2000 B.C. in France, 1800 B.C. in Britain. The first metallic products took the form of axes, elementary knives, and small tools and ornaments. With metal adoption may be placed the coming of the Celt, traced by evidences in the round barrows. Pottery takes a prominent place in the implements used by the peoples of the time. As the Neolithic Age was incalculably shorter than the Palæolithic, so the Bronze Age was of less duration than the preceding period. It is certain that bronze tools preceded iron. The metal is a mixture of copper and tin, and here exists a proof of the apophthegm that the march of knowledge renders the next step less laborious, for iron can be procured direct from the ore. The casting of the bronze from the necessary copper and tin was, of course, of the most elementary character, a simple furnace in the ground dependent on wind for its draught, and rough moulds of thick clay with a lip at the rim. Large numbers of bronze implements are constantly being found in Britain, and the fact of their repeated discovery destroys the contention that the tools were imported. The weapons of the Bronze Age were spears, swords, and axes or 'celts,' the edges being sharpened by stone hammers.

The introduction of iron began about 1000 B.C., the earliest evidence of which was found in S. Europe. From here it spread over all Europe. From this point advance was as rapid as it was previously slow, and once again the relative length of the period is shortened by the same tremendous rush of time. Contemporary with the advent of iron was the existence and use of gold. In Ireland the prehistoric use of metal presents many interesting data of study, and it is certain that the early wealth of that country must have been enormous. Curiously enough, silver was almost unknown yet in Europe, its only place of existence being the Mediterranean coast of Spain.

In the nineteenth century archaeological excavation was concerned mostly with Europe and the Mediterranean civilisation. The most notable achievement was Schliemann's discovery of anct. Troy and his excavations at Mycenæ. He also pointed to Cnossos as the centre of anct. Mediterranean culture, and subsequent excavations in Crete have revealed, details of the Minoan civilisation. (See also CRETE.) Meanwhile an impetus had been given to archaeological research by the decipherment of the Rosetta stone by Champollion about 1830, and by the end of the century the hist. of anct. Egypt, through the genius of Prof. Flinders Petrie and others, was fairly completely unravelled. The crowning achievement of Egyptian A. was the discovery of Tutankhamen's (q.v.) tomb

by Lord Carnarvon (q.v.) and Howard Carter (q.v.) in 1922. In this year also a joint expedition authorised by the Brit. Museum and the Museum of Pennsylvania set out under Leonard Woolley (q.v.) for Mesopotamia, which had for long been the centre of tentative research. The expedition was so far successful as to gather sufficient material to reconstruct the anct. Sumerian civilisation of Ur (q.v.), together with indisputable evidences of the Flood and of a civilisation before the Flood.

From 1881 to 1894 A. P. Maudsley, together with the artist Catherwood, surveyed the monuments and ruins belonging to the pre-Sp. civilisation of Central America. Much still remains to be done, but research has enabled evidence to be put together of the old empire of the Mayas (q.v.), situated in Chiapas, Guatemala, and Honduras. For reasons not yet incontestably explained there was an exodus of the Mayas in about 400 A.D. both to Yucatan and to Oaxaca. The Mayas were thus brought into contact with the early Toltec culture of Mexico which preceded the Aztec, and their influences upon Mexican life and art can be traced. Mayan art has some affinities with anct. Egyptian art, and there is also a similarity between the designs, games, and recreations of anct. Mexico and those of China, and India, but beyond that no connection has been estab.

Penetrating deeper into S. America, archaeologists have been able to discover details of the barbaric empire of the Incas, which at the time of the Sp. conquest included the states now known as Ecuador, Peru, Bolivia, and part of Chile and Argentina. Some of the most valuable finds both from an archaeological and artistic point of view have been those of hand-modelled pottery. From this pottery Prof. Uhle deduced 4 successive periods of culture once existent in Peru. The possibility of Mayan influence at one period may be admitted in so far as it may help to prove the whole of Amer. culture to be indigenous in its origin, and the improbable theory of an immigration of peoples from China and Polynesia would then be discounted.

The modern progress of A. has made rapid strides. New and powerful aids in photography, in cheap and at the same time reliable illustration, in the recognition by young people of the ethnological value of all fossils and archaeological remains, tend to assist its march, and with little doubt the available facts of to-day will be a shadow in comparison with the accumulated data of to-morrow.

The important aid that the invention of the aeroplane has rendered A. deserves special treatment. It has long been known that a vertical view, or photograph, would reveal anct. disturbances of the soil that could not be perceived on the ground. Chalk, for instance, once dug can never be restored to its former state. Earlier attempts at vertical

photography, by free balloons and box-kites, were not very successful. The First World War led to great activity in vertical photography for military purposes, and this led subsequently to members of the R.A.F. noticing on their photographs the signs of soil disturbances in past centuries. Col. Beazeley, in Iraq during the war, in 1917, noted the traces of buried cities; while in England, in 1922, 2 air officers, Clark Hall and Haslam, first drew attention to the traces, visible to the observer aloft, of disturbed land. In 1933, an aviator flying over the Dead Sea detected traces of an ancient. The interest of the public in this form of exploration was first roused by the discovery by Mr. O. G. S. Crawford (archæological officer to the Ordnance Survey), of the complete course of an avenue at Stonehenge. This was in 1923, and in the following year Mr. Crawford published a volume containing about 300 aerial photographs.

*Recent discoveries in Britain.*—The discovery of pre-Crag man in Darnsden, Suffolk, is considered by archæologists to be the most impressive advance in Eng. prehistoric studies or studies of pre-Paleolithic man in recent years. For pre-Crag man inhabits a land which was previously supposed to be untenanted by the human race. The discovery of his flint instruments has 'increased in length the long dim vistas of prehistory, and now that we have seen him in the far-off distance we may the more boldly scan the mists beyond him that still hide the uttermost beginnings of man's story in this country' (T. D. Kendrick). The discovery by Mr. Reid Moir in 1920 of the 'great flint implements' of Cromer—a workshop floor of early Chellean times on a flint-strewn patch of foreshore 150 yds. long—is important as proving that the Wash-Bristol Channel line is no longer to be regarded as the N. limit to the field of study of Lower and Middle Paleolithic man. Study since 1914 of the so-called 'New Stone' Age would seem to show that we have only recently begun to understand the Neolithic period. 'Not so very long ago,' says Mr. Kendrick, 'the neolithic period emerged out of a cloudy and uncertain mesolithic period as a vast "polished axe" period lasting many thousands of years, during which agriculture and the art of potting were introduced, and the inhab. of Britain buried their dead in long barrows. We see now that these changes in manner of life and in custom took place in a period which, though of astonishing vigour, was in reality short. . . . As the result of new discoveries the polished axe has ceased to be the touchstone of the neolithic period [and] . . . to understand the neolithic period itself we turn away from the axes to field-monuments and to pottery.' The discovery of 'Woodhenge,' 2 m. N.E. of Stonehenge, was the result of an air photograph taken in 1925, and is one of the most remarkable triumphs of what is not unnaturally called 'archæology from the air.' The name 'Woodhenge' was invented during the subse-

quent excavations (see Mrs. Cunningham's *Woodhenge*, 1929). Excavation of spear-heads, winged axes, sword-types (especially Hallstatt), bronze 'maple-leaf' razors, gold bracelets, bronze cauldrons, sepulchral pottery, and so on, confirms the position that the late Bronze Age in England and Wales is, taken as a whole, a period of continental influence and immigration (e.g. the Hallstatt sword implies a Lower Rhenish culture, while winged axes seem to be of Alpine origin) acting upon native traditions. Like the Achæans, the Celts seem to have assimilated the culture of the Ægean area and that of the Ægean colony at Halstatt (Austria) and it was they who were the 'carriers' of the La Tène Iron Age (i.e. the continental period which ensued on the initial Iron Age culture into Britain and Ireland). The potter's wheel was introduced by them into Britain during the archæological early Iron Age; and it is conceivable that the crematory people of the Bronze Age were a Celtic race; for during that age Celtic peoples were filtering into Britain from Gaul, having apparently come originally from the Danube region. Excavation of the hill-forts or 'camps' of the early Iron Age in England and Wales has rendered classification and grouping possible, and the copious material was collated in 1913 by Mr. C. F. C. Hawkes, who shows that the idea and practice of the building of the forts was introduced by the Iron Age invaders; that the forts were the citadels of tribal groups; and that their numerical increase in the centuries after the immigration estab. tribal consolidation and development. A number of Iron Age forts have been excavated since 1914—mostly a single rampart and ditch (e.g. Liddbury and Liddington Castle, Wilts., Thundersbarrow Hill, Sussex; the Chastleton, Oxon.). More evidence of burial customs has been found by recent excavation, e.g. of a cemetery at Harlyn Bay in N. Cornwall in 1921, and at Barnwood, Gloucestershire, in 1930. These discoveries have also thrown light on the range of types of our Iron Age pop., types tending to medium- or long-headedness, the outcome of the fusion and supervening of invading Celts on earlier indigenous strains, and they also increase our knowledge of the influence in England of the culture of the La Tène period as exemplified, e.g., in pottery, brooches, bead-rim urns, medallions, etc.

More recent archæological study of Rom. Britain has intensified the distinction between Romanisation before the conquest and of native traditions continuing after it, it being recognised that in studying a Rom. prov. the character and abundance of the material demand a different approach. Our progress in the direction of the study is due to the work of Francis John Haverfield (d. 1919) (see his *Romanisation of Roman Britain* (Oxford) (1906), ed. by Sir George Macdonald in 1923; *The Roman Occupation of Britain* (Ford Lectures, ed. by Sir George Macdonald); R. G. Collingwood's introduction *Roman Britain* (Oxford,

1932); and *The Archaeology of Roman Britain* (1930) which gives systematic accounts of every class of Rom. antiquities—roads and military works, ins., vils., villas, inscriptions, pottery, tools and weapons, and coins. See also Prof. J. G. C. Anderson's ed. of Tacitus's *Agricola* (Oxford, 1922), which contains much material by Haverfield. For an admirable summary of all recent study and discoveries on this period in England and Wales see Chapter XI of Kendrick and Hawkes, *Archæology in England and Wales, 1914-31* (1932).

See also the accounts of discoveries by archaeologists referred to in the present article; and D. A. Mackenzie, *Ancient Man in Britain*, 1922; M. C. Burkitt, *Our Early Ancestors* (for Neolithic Britain), 1926; V. G. Childe, *The Dawn of European Civilisation* (for Britain in Mesolithic and Neolithic periods and Early Bronze Age), 1925; Brit. Museum's *Guide to the Antiquities of the Bronze Age*, 1920, and *Guide to the Antiquities of the Stone Age* (3rd ed.), 1926; and the general topographical studies and period studies listed in the above work by Kendrick and Hawkes.



ARCHÆOPTERYX

**Archæopteryx** (Gk. ἀρχαῖος, ancient, πτερυγ, wing), a fossil bird found in Bavaria which presents characteristics of birds and reptiles. It is the sole genus of the order Saurura, and is the oldest known bird. Its size was that of a crow, it had teeth in both jaws, a lizard-like tail of 20 vertebrae, each giving rise to a quill feather, and 3 claw-like digits at the end of each wing. Two specimens are extant. *A. macrura* in Berlin, *A. lithographica* in the Brit. Museum.

**Archaism**, the retention, or imitation, of what is old or obsolete, especially in language and art. Archaic means primitive, antiquated, no longer in common use. Both words are modifications of Gk. words derived from ἀρχαῖος, old.

**Archangel**, a region of the R.S.F.S.R. It is bounded on the N. by the White Sea and Arctic Ocean, on the W. by the Karelian S.S. Republic, on the S. by Vologda and the N. Dvina, and on

the E. by the autonomous Komi area. The old E. boundary extended to the Urals and the W. to the Finnish border. Included in its area are the dists. Archangel, Orega, Petchora, Mezensk, and the is. off the coast. A portion of the dist. lies within the Arctic circle and is extremely desolate and barren. In the height of summer the soil is frozen. All the rivs. are frozen from Sept. till July. They are Tuloma, Orega, Dvina, Mezen, and Petchora. The climatic conditions of the peninsula of Kola are more temperate. Its surface is interrupted by hills and large lakes, e.g. Imandra. To the S. of the Arctic region the soil is covered with forests, with here and there lakes and morasses, and at intervals good pasture. Here the rivs. are closed from Oct. to Apr. In the N. dists. the inhab., necessarily nomadic, include Samoyedes, Zyryans, Lapps, and Finnish tribes. They support life by fishing and hunting. In the 'wood combines' of the A. region there are factories for wood processes and chemical industries, and paper manufs. are also carried on within the combines. Its area is 331,505 sq. m., and its pop. 1,199,000 (urb. 435,000, rural 764,000).

The administrative centre of the prov. is A. at the head of the delta of the Dvina. Its hist. has been traced back to the Norsemen of the tenth century. In 1553 Richard Chancellor (q.v.) got as far as A. and journeyed thence overland to Moscow to open negotiations for trade with England. In the time of Peter the Great A. was Russia's only port, for the Swedes controlled the lands around the gulf of Finland and the Turks the shores of the Black Sea. During the First World War it was in much the same condition, for with the closing of the Baltic and Black Sea ports, it was the only one left that was served by a railway. This led to its rapid development. It was the scene in 1918 of a serious attempt to combat Bolshevism. Allied forces, under Brit. leadership, were landed there, being joined by Russian imperialists. The attempt proved abortive, since the Russians, converted by Bolshevik propaganda, turned on their allies, and forced them to evacuate the dist. The evacuation of the Brit. forces both in A. and in Murmansk was carried out by Gen. Lord Rawlinson's N. Russian Relief Force, which landed at A. in the spring of 1919. Its manufs. (1930) are linen, leather, canvas, cord, mats, tallow, potash, and beer. Saw-milling is an important industry, and timber is floated down the N. Dvina to the saw-mills at A. Wheat and flour are shipped from S. Russia to supply the flour mills and linen factories of A. The tanning and dressing of hides and skins is carried on, and there is also a small metallurgical and shipping industry. By 1937 well-equipped shipbuilding and repairing yards had been estab. or reconstructed at A. Its harbour is open from May to Oct. The shortest day has only 3 hrs. 12 min., while the longest is 21 hrs. 48 min. Pop. of the city is about 280,000.

**Archangel**, a chief angel or a leading angel. According to Jewish writers, an angel of the eighth rank of the celestial hierarchy. *See under* ANGEL.

**Archangel**, a name of sev. species of dead-nettle (*Labiatae*) and allied plants (*Lamium*, *Galeopsis*, *Galeobdolon*, *Stachys*).

**Archbald**, a bor. in Lackawanna co., Pennsylvania, U.S.A., 10 m. N.E. of Scranton. Coal is worked and the chief industry is weaving. Pop. 10,000.

**Archbishop**, the title of a bishop of superior rank who has jurisdiction over other bishops. The title when it first came into existence did not imply that the holder had metropolitan power. In the Rom. Church at the present time, however, the title of A. can usually be said to imply metropolitan power. In other churches the terms, however, are not interchangeable. The title seems to have been first used in the early Church, being used by Athanasius and by Gregory to imply respect to their predecessors. In the E. Church the title was much more common than in the W., but gradually, with the right to summon provincial councils, the metropolitans began to assume the title of A. The As., however, were not allowed to assume authority independently of the papacy, since they were compelled to receive the pall at the hands of the Bishop of Rome. In the Rom. Church the power of the modern A. is hardly comparable with the power of the mediæval bishop. The right to wear the pall is only granted to such As. as have metropolitan jurisdiction, since there are a number who have merely titular archbishoprics. Until the pall is received and the oaths of fidelity and obedience are taken to the papacy the A. is only recognised as the A. elect, and cannot use his full powers. In England the Church is governed by 2 As., the A. of Canterbury, who is also 'Primate of all England,' and the A. of York, who is 'Primate of England.' At the time of the foundation of the Church by St. Augustine the original plan was to divide England into the 2 provs. with 2 As., 1 at London and 1 at York, who were to take precedence according to seniority, but during the pre-Reformation period the metropolitan of Canterbury exercised the functions of papal legate throughout all England. At the present day he possesses powers over both provs., he can grant licences for marriage which are valid in both provs., and can appoint votaries who can practise in both provs. Amongst his other powers he numbers an ability to grant Lambeth degrees in music, law, and theology. As the metropolitan of the S. prov. he is the guardian of all vacant sees, and appoints to benefices during such vacancy. He has also jurisdiction over all bishops within his prov., and has the privilege of visitation and deprivation which is not exercised by the A. of York. It is also his privilege to crown the kings and queens of England,

and to consecrate all bishops within his prov. He is also an eccles. commissioner for England. He takes precedence immediately after the princes of royal blood. The powers of the A. of York are very similar to those of the A. of Canterbury, with the exceptions which have been pointed out. The As. of York have the privilege of crowning the queen consort, and of being her perpetual chaplain. The A. is one of the eccles. commissioners of England, takes precedence after princes of the royal blood, and the lord chancellor. As. have the title of His Grace, and Reverend Father in God.

**Archdeacon**, a high office of the Christian Church whose rank is directly subordinate to that of bishop. He is the bishop's vicar or viceregent, the representative of the bishop, attached to the cathedral, and having jurisdiction over the clergy and authority to manage the affairs of the diocese. He presides over a court where certain eccles. causes are heard. Originally he was the chief of the deacons who assisted the bishop in eccles. affairs. The distribution of the dioceses into archdeacons cannot be assigned to any certain time. In the fifth century As. rose from mere bishops' assistants, and took upon themselves some of a bishop's powers and privileges. Gradually they acquired a position which was recognised apart from the bishop, and claimed a jurisdiction to themselves. In the thirteenth century protests from sev. synods were successful in securing a curtailment of their powers by episcopal courts. It is their special duty to inspect the buildings within their range of supervision, and to undertake the repair of eccles. property. As. are obsolete in the Rom. Catholic Church in England.

**Archduke**, a title borne by members of the former Austrian royal family. It denoted a rank above all other dukes, bearing superior powers and rights.

**Archegoniata** is a botanical term applied to the div. of the vegetable kingdom which contains plants having an archegonium (q.v.). It includes the Bryophyta (liverworts and mosses), and the Vascular Cryptogams (ferns and sclaginellas).

**Archegonium** (Gk. ἀρχή, first, γόνος, offspring) is a term applied to the female sexual organ of the prothallus of such plants as the mosses and ferns. It is flask-shaped with a slender neck and a swollen venter, in which is the ovum (oosphere or egg-cell). Fertilisation takes place by means of spermatozoids which pass down the neck.

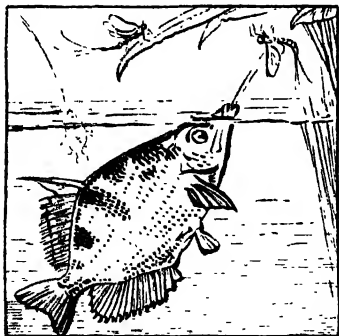
**Archelon**, a Gk. word meaning public place belonging to magistrates. It was used in Greece to denote gov. buildings, but was especially the name of the building where the archives were kept. In Athens this was the temple of the mother of the gods.

**Archelaus**, king of Macedonia (413-399 B.C.), obtained the throne by the murder of his uncle, cousin, and half-brother. He ruled wisely, and attempted

to inculcate the refinements of Gk. civilisation among his subjects.

**Archelaus** of Cappadocia (first century B.C.), a general of Mithradates the Great. In 87 B.C. he was sent to Greece with a large army, and was besieged by Sulla and defeated. Later he deserted to the Romans.

**Archelaus**, his son, king of Egypt. In 56 B.C. he married Berenice. He reigned only 6 months, being defeated and slain by Anulus Gabinus in 55 B.C.



ARCHER-FISH

**Archelaus** (d. A.D. 16), son of A. and Glaphyra, received the kingdom of Cappadocia, 36 B.C. He fought on the side of Antonius at the battle of Actium, yet he retained his kingdom under Augustus. Incurring the displeasure of Tiberius, as it is said, because he neglected the future emperor during his exile at Rhodes, he was summoned to Rome, where he d., apparently a natural death brought on by old age and infirmity. (Tacitus, *Ann.* II. 42; Dion. lvi.)

**Archelaus** of Miletus, Gk. philosopher of Athens. He lived during the fifth century, and was a pupil of Anaxagoras. Ion of Chios says he was a teacher of Socrates. The only traces of his work are to be found in quotations from Diogenes Laertius, Simplicius, Plutarch, and Hippolytus.

**Archelaus**, bishop of Carrhae in Mesopotamia, had a controversy with the heretic Manes c. A.D. 278. He pub. the controversy in 2 books, entitled *Acta Disputationis*, etc., in Syriac, which were trans. into Gk. by Hegemonius. A fragment of this work is extant, ed. by Valesius, in the notes of his *Socrates*, pp. 197, 203, lib. I., c. 22; and again in a more complete form by Zaccagnius in his *Collectanea Monumentorum veterum Ecclesiae Graecae*, Rom. 1698 (Fabricius, *Bibliotheca Graeca*).

**Archelaus** (fl. A.D. 10), king of Judaea, son of Herod the Great. He refused to accept the throne before obtaining the consent of Augustus. His journey in quest of Augustus's agreement was

successful. A violation of the Mosaic law caused his deposition and banishment.

**Archenholz**, Johann Wilhelm von (1743-1812), a Ger. historian. He was b. at Langfuhr, Danzig. At the age of 16 he entered the Prussian army, taking part in the concluding stages of the Seven Years War. His hist. of the war is the work by which he is best known, and by which he became recognised as an historian of brilliant power. His other works include *England und Italien*, *Annalen der britischen Geschichte*, and various periodicals of a literary and political colour. He d. at Oyendorf, near Hamburg.

**Archer-fish**, the *Toxotes*, an Acanthopterygious fish of the family Toxotidae, found off the Australian and E. Indian coasts. It casts a drop of water from its mouth on to an insect playing near the surface of the sea, causing it to fall in, when it is devoured.

**Archer**, Frederick (1857-86), jockey; b. at Cheltenham. Rode his first race, 1870. Won the Derby 5 times, Oaks 4. St. Leger 6, Two Thousand Guineas 5.

**Archer**, Frederick Scott (1813-57), b. at Bishop Stortford. Inventor of the collodion process in photography and sev. improvements to the camera.

**Archer**, The, see SAGITTARIUS.

**Archer**, Thomas, architect, d. 1743. Pupil of Sir John Vanbrugh. Architect of Heythorpe Hall, Oxfordshire; St. Philip's, Birmingham; St. John's, Westminster, etc.

**Archer**, William (1856-1921), dramatic critic, b. at Perth, Sept. 23; son of Thomas A., C.M.G., of Queensland. Received degree of M.A. at Edinburgh, 1876. Travelled in Australia, 1876-77; and, after returning to Edinburgh, went to London, where he soon took a prominent position in the literary world. He became dramatic critic on the *World*, 1884, and, later, went to the *Nation*. He did much to popularise Ibsen in England. He trans. (either alone or in collaboration with his brother, Charles A.) a number of Ibsen's plays, as well as editing Ibsen's prose dramas in 5 vols., 1890-91. His works include: *English Dramatists of To-day*, 1882; *Masks or Faces*, 1888; *The Theatrical World*, 1893-97; *Study and Stage*, 1899; *Poets of the Younger Generation*, 1901; *Real Conversations*, 1904; *A National Theatre: Schemes and Estimates*, with H. Granville-Barker, 1907; *The Thirteen Days*, 1915; *India and the Future*, 1917; *War is War* (drama), 1919; *The Green Goddess* (popular drama), 1921; *The Old Drama and the New*, 1923; He also wrote 3 plays pub. posthumously: *Martha Washington*, *Beatrice Juana*, and *Lidia*. He d. in London.

**Archery**, the use of the bow and arrow, both for hunting and warfare, is widespread and dates from very early times. The foremost archers of antiquity were the Egyptians, who used bows a little shorter than a man, and arrows, headed with bronze or flint, 2 to 3 ft. long. On the authority of the Bible and other writers, the Jews were deadly with the

bow, which seems with them to have been made of reed, wood, or horn. All Asiatic nations were bowmen, notably the Babylonians, Persians, and Scythians. In medieval times the Arabs and Turks were famous archers, as were the Jap. till recent times. Exploration has revealed the use of the bow among the natives of the E. and W. Indies, S. America, the Arctic circle, and Central Africa. The Germanic nations and the Welsh appear to have been most proficient in A. in



ARROW

early European hist. The Gks. and Romans. in anct. times, despite the legends of Teucer, Ulysses, etc., seem to have been indifferent archers, and recruited their bowmen from Crete and Asia Minor. After the fourth century A.D., however, the Rom. army consisted largely of mounted archers. Scandinavian legend has many references to famous bowmen, and by the tenth century the short bow was the chief weapon of the poorest military classes in England, France, and Germany. Both the Eng. and Normans employed mounted archers at Hastings in 1066. The cross-bow, or arbalest, for the shooting of bolts, which was mounted on a stock and discharged by a catch or



ARCHERS AT AGINCOURT

trigger, was also much in use, especially in sieges and naval battles, though it was condemned by the Lateran Council of 1139. It made its reputation in the crusades, proving much superior to the bow used by the mounted Asiatic archers. In Europe the best exponents of its use were the Genoese, Pisans, and Venetians. Its use in England was forbidden by Henry VII. The famous English long-bow, 5 ft. long with a shaft a cloth-yard long, seems to have been introduced from Wales. Its long range and speed were proved at Falkirk in 1298, and the Eng. archers played an important part at Crécy, Poitiers, and Agincourt. A. was supported by all the kings, who encouraged its practice for sport, as is witnessed by the many

ballads on the skill of Eng. marksmen. The introduction of gunpowder, which began early in the fifteenth century, naturally meant the gradual decay of A., but its disappearance in England was slow. In the reign of Elizabeth treatises on the art were still being written; notably the *Toxophilus* of Roger Ascham, 1545, a detailed and practical work. The long-bow died out at the end of the sixteenth century and the cross-bow early in the seventeenth. In 1807 horse archers were used in Poland against Napoleon, and in 1860 the Chinese used bows at Taku. In the mid-eighteenth century there was a great revival of A. for purposes of health and exercise, which resulted in 1781 in the formation of the Royal Toxophilite Society. Other societies for the practice and encouragement of the art are the Woodmen of Arden, 1785, having headquarters at Meriden in Warwickshire; John o' Gaunt's Bowmen, 1785, and the Royal Company of Archers (Scotland), dating from 1676. The main legislative and managing body of Eng. A. at the present day is the Grand National A. Society, founded 1861, which holds meetings for the sport, the most important being the championship, the Leamington and Midland Co., the Grand W., and the Grand N. Modern bows are usually made of yew, either 'self,' or backed with other woods. The former, though the truer and more sensitive, are more expensive, and liable to crack and lose shape. The length of the bow varies from 5 to 6 ft., according to that of the arrows used (25-30 in.). The string is made of 3 strands of hemp, dressed with glue, and has a drawing power of 40-60 lb. for men, and 24-32 for ladies. The arrow has a shaft, which may be of various shapes, made of red deal, a 'pile,' or point, and 'nock,' cut square, and 3 turkey or peacock feathers, all curving one way.

Arches, Court of, an eccles. court of appeal of the archbishop of Canterbury, so called because it was anciently held at the church of St. Mary of the Arches, now St. Mary-le-Bow. It has power to deal with suits sent up from the consistorial courts of the prov. of Canterbury. The presiding judge was originally known as the official prin., but his duties and title have now become merged with those of his subordinate, the dean of the arches. Since 1874 he has also been chief judge of the chancery court of York.

Archias, A. Licinius, a Gk. poet, who was b. at Antioch in Syria c. 120 B.C. He gave lessons to Cicero in philosophy and rhetoric (*Pro Archia*, i.), and practically all the information we have of him comes from Cicero's speech; he came to Rome in 102, where he gained the friendship of the Luculli. He became a citizen at Heraclea in Lucania; and when this tn. was united to Rome he became a Rom. citizen. When he was accused in 61 of usurping the citizenship of Rome, he was defended by Cicero in the speech

**Pro Archia.** A. commemorated the victories of Marius and Lucius Catulus over the Cimbri in a poem, and some of his epigrams are in the *Gk. Anthology*.

**Archibald, Raymond Clare** (b. 1875), Amer. mathematician, b. in Colchester co., Nova Scotia, and educated at Mount Allison Univ., Sackville, New Brunswick, Harvard, Berlin, etc. Gained some distinction in violin-playing. But it is as a student of mathematics that he has won most distinction, and has held numerous posts on that account. After occupying a mathematical professorship at Acadia Univ., Nova Scotia, and an instructorship at Brown Univ., he became associate prof. at Brown Univ. 1917-23. Elected fellow of the Amer. Academy of Arts and Sciences, 1918; editor-in-chief of *American Mathematical Monthly*, 1922; librarian of the American Mathematical Society in 1921; member of the National Research Council, 1928-31; Publications: *Euclid's Book on Divisions of Figures with a Restoration*, 1915; *The Training of Teachers of Mathematics for the Secondary Schools of the Countries represented by the International Commission on the Teaching of Mathematics* (of which he was a member), 1918; *Bibliography of Egyptian and Babylonian Mathematics*, 1927-29; and numerous contributions to European and Amer. journals and reviews.

**Archidamus.** There were 5 kings of Sparta of this name. They were of the royal line of the Proclidae. The first is only mentioned by Herodotus (viii. 131).

**Archidamus II.**, son of Zeuxidamus, became king when his grandfather, Leotychides, was banished from Sparta. A. reigned from 469 to 427 B.C. Prudence and foresight, steadiness of purpose and gravity of deportment were his prominent qualities. In the fourth year of his reign Sparta was nearly annihilated by an earthquake, an opportunity of which the Messenians took advantage to attempt the recovery of their independence. A., by his presence of mind, saved what remained of the city from the hands of an exasperated foe; but it was not till the end of 10 years that this third Messenian war was brought to a close, when the Messenians evacuated their citadel, Ithome. (Diod. Sic., xl. 64; Thucyd., i. 103.) A. is not mentioned again till we find him speaking on the peace side in the council held by the Lacedaemonians before they resolved on the Peloponnesian war. Though a declaration of war was the result of their deliberation (431 B.C.), the Lacedaemonians gave him the command of the troops against the Athenians. He was their general also in their second expedition (428 B.C.) and third expedition (428 B.C.). He was succeeded by his son, Agis II., probably in 427 B.C. (Thucydides, i. 79; ii. 10-20, 71; iii. 1.)

**Archidamus III.** (d. 338 B.C.), the son of Agis II., succeeded his father 361 B.C. He commanded the Spartan troops during his father's lifetime, 36

B.C. and gained the 'tearless battle' against the Arcadians and Argelians: not one of the Spartans fell, but a great many of the enemy were slaughtered. He was sent (338 B.C.) to Italy to assist the inhab. of Tarentum, who were at war with the Lucanians. He fell bravely at the head of his troops, and a statue was erected to his honour at Olympia by his countrymen. He was succeeded by his son, Agis III. (Diodorus Sic., xvi. 24, 63; Pausanias, iii. 10.)

**Archidamus IV.**, grandson of A. III., king of Sparta in 294 B.C.

**Archidamus V.**, grandson of A. IV., king of Sparta in 240 B.C.

**Archidona**, tn. of Andalusia, Spain, 34 m. W. of Málaga. Pop. 8880.

**Archidoris**, see DORIS.

**Archigenes of Apamea** lived during the reign of the Emperor Trajan, and was a medical author and practitioner at Rome (see Juvenal, *Satires*, vi. 236; xiii. 98; xiv. 252). He followed the principles of the Pneumatic sect, founded by Athenæus of Attalia, and wrote treatises on pathology and the practice of medicine and surgery. His fragments are in the works of Galen, Aetius, and Oribasius.

**Archil**, or **Orchil**, a violet dye which is obtained from several species of lichens, notably from the *Roccella tinctoria*. As materials dyed solely with it fade readily in the sunlight, another dye is usually employed at first and the A. is used to give an added brilliance.

**Archilochus**, Gk. lyric poet, probably of seventh century B.C., b. at Paros, which he left to join the colony of Thasos. Killed in battle between the Parians and Naxians. He enjoyed a very high reputation among the ancients, especially for his iambic satiric poems. The few fragments of his work which remain, though vigorous and wide in range, hardly justify extravagant eulogy.

**Archilute**, a large lute of the theorbo type with 2 sets of strings, the pegs of which were set at different distances in the double neck; the longer bass strings had no fingerboard and could therefore not be altered in pitch during performance.

**Archimagus**, or the Anglicised form **Archimago**, was used to denote a chief magician, a mighty worker of things 'mystic, wonderful.' In Spenser's *Faerie Queene* it is applied to the personification of hypocrisy.

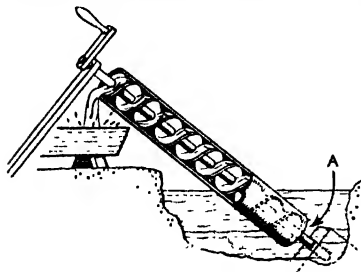
**Archimandrite**, the title of the highest order of superiors of convents in the Gk. Church, almost corresponding to that of abbot in the Lat. Church. Russian bishops are chosen from the As.

**Archimedes** (287-212 B.C.), the most celebrated mathematician and engineer of antiquity; b. at Syracuse. He is said to have been a kinsman of King Hiero. His mathematical studies relate chiefly to the relation of spherical and rectilinear surfaces and bodies, but he is most famous for his discoveries in hydrostatics and mechanics. He estab. the principles of the lever, and



of the equilibrium between a floating body and the hydrostatic pressure of the liquid in which it floats, and invented many military engines which postponed the fall of Syracuse. He was killed when the city was taken by the Romans.

**Archimedes' Screw**, a machine for raising water. It may consist of a tube wound spirally round a cylindrical axis or a cylinder enclosing a screw so as to form a spiral chamber from end to end. The lowest portion of the screw just dips into the water, and as the cylinder is turned a small quantity of water is scooped up. The inclination of the cylinder is such that at the



ARCHIMEDES' SCREW

A, Opening for entry of water.

next revolution the water is raised above the next thread, whilst the lowest thread scoops up another quantity. The successive revolutions, therefore, raise the water thread by thread to emerge at the top of the cylinder. The machine is used in Holland for draining purposes, and the same principle is sometimes used for raising grain to a higher level in a continuous stream.

**Archinard, Louis**, b. at Havre in 1850, a famous Fr. general. He entered the naval artillery, served in Senegal, became major (*chef d'escadron*), 1884, went to the Sudan, took Segou-Sikoro, and was made lieutenant-colonel. In 1891 he took Nioro, Youri, and Bissandougou, and in 1892 he was recalled to France and made colonel. He afterwards returned to the Sudan as commander-general, which position he held until 1893.

**Archinus**, an Athenian who lived during the latter part of the fourth and the beginning of the fifth century, was the companion of Thrasybulus. He helped to overthrow the thirty tyrants of Athens, and was mainly instrumental in bringing about the famous amnesty when the democracy was restored in 403. It was owing to him that public documents were written in Ionian instead of in Attic characters.

**Archinto** was the name of a celebrated family of Milan whose prin. members were: (1) A. (1500-58), archbishop of Milan. (2) Alessandro A., a theologian who d. in 1558. (3) Count Filippo A., b. in 1649, governor of Cremona 1692-94. (4) Giuseppe A. (1649-

1712), cardinal and archbishop of Milan. (5) Carlo A. (1669-1732), son of Giuseppe A., who pub. Muratori's *Scriptores rerum Italicarum*, and founded the Palatine Society.

**Archipelago**, a Gk. term (=chief sea) originally applied to the Aegean Sea, and now to any sea thickly scattered with islands.

**Architects**, American Institute of, is the national organisation of architects in the U.S.A. The institute was founded in 1857, and has its headquarters at the Octagon, Washington, D.C. It is governed by its officers and a board of directors, who meet quarterly. These are elected by the delegates, from the 58 chapters throughout the country, at their ann. meeting. Among its publications is the monthly *Journal of the Institute of Architects*. The object of the institute is to serve as a fellowship for those engaged in the profession of architecture, to protect their interests, and to raise the level of the art and science of architecture. In recent years much attention has been given by the institute to the co-ordination of the art of architecture with those of painting, sculpture, and landscape gardening.

**Architects**, Royal Institute of British, founded 1834, incorporated 1837, re-incorporated 1887. The chief Eng. architectural body. It holds examinations and confers the diplomas of Associate (A.R.I.B.A.) and Fellow (F.R.I.B.A.).

**Architects**, Society of, founded 1884, incorporated 1893; held examinations twice a year. The society has now been absorbed by the R.I.B.A.

**Architectural Association**, a body constituted in 1847 for the purpose of giving instruction in those branches of A. knowledge which are not covered by the training received in the offices where the pupils are engaged. It awards certificates, medals, and prizes, and finally prepares for the examinations of the Royal Institute of Brit. Architects. It works in full agreement with the other societies, its fees are moderate, and its lecturers include the most able men of the time.

**Architectural Societies**, see ENGINEERING AND ARCHITECTURAL SOCIETIES.

**Architecture** (Lat. *architectura*, Gk. ἀρχιτεκτονία—*archi-*, chief, and *tektoni-*, a builder). In the widest sense of the word, A. includes all kinds of building and construction, with 4 main divs. Eccles. A. deals with the erection of churches and houses dedicated to God; civil A. has to do with buildings for the ordinary purposes of the State and the individual; military A. deals with fortifications and constructions for attack and defence; naval A. concerns itself with the construction of ships, and all the fittings incident on their use. But this is by no means the general meaning of the term A., which may better be defined as building become an art, building which is not controlled only by aims of use

and comfort, but also by aims of beauty, grandeur, and other æsthetic principles. Until the Renaissance, A. was universally regarded as the chief of the arts, and it is here that we can easily see portrayed much of the spirit and the genius of each of the races which have employed it. Like every other art, it has ever been conservative, but in the change of the A. we may see mirrored changes in gov. or in prevailing influence or the steady progress of decay. Most especially is this true of the Gothic A., for the splendid cathedrals of Europe in one or other of the Gothic styles are the greatest and clearest embodiment of the spirit of the Middle Ages. It was a spirit which, though shared by a Europe united at last by the ties of religion, yet showed itself variously in the individual countries. It is noticeable, too, that though architectural features have been handed from nation to nation, yet originally each people had its own system, a system regulated primarily by the climate and the building materials at hand. For A. did not spring into being fully armed; her beginnings are, on the contrary, extremely modest. They are to be sought in the huts of primitive hunters, shepherds, and farmers. The first material used for these erections must plainly have been wood, and this theory is confirmed by the fact that even the stone erections of Egypt are accurate copies of wooden buildings. Even in the great Gk. orders, indeed, the imitation of wood construction still remains, e.g. in the dentils of the entablature, which are a copy of the wooden rafters projecting over the edge of the building. Next, probably bricks, moulded and dried in the sun, were used, and finally stone was cut and moulded.

*Egypt.*—Though investigations seem to show that the earliest stable buildings of mankind were erected in the valley of the Euphrates and the Tigris, yet it is to Egypt, the valley of the Nile, that we must look for our most anct. remains of A., which date back to the period of the Anct. Empire, c. 4000 B.C. At that time the cap. was at Memphis, and it is round this tn. that the early tombs are found. To the same period belong the 3 pyramids generally known by the names of the kings who erected them as Cheops, Cephren, and Mycerinus. The pyramids were erected to receive the body of the king, and are all built on a square base, from which, in the case of Cheops, the largest, the pyramid rose to a height of 480 ft., the length of 1 side of the base in the same pyramid being 760 ft. Neither the pyramids nor the *mastaba* tombs of the same date possess marked architectural features, and it is not until about 2775 B.C. that, in the tombs at Beni-Hassan (Upper Egypt), we find the germ of an important style. These tombs are cut in the solid rock, and here various types of columns are found in use, one of them being the prototype of the Gk. Doric order. But it was not

until the New Empire under the Theban kings (c. 1700 B.C.) that the great age of Egyptian A. began. Of its temples, some were entirely excavated, some were partly excavated, partly structural, and some were entirely structural. Round about Thebes are to be found many magnificent remains of the industry and conceptive power of this period. On the E. bank of the Nile are the great temple of Karnac and the temple of Khuns, on the W. bank lay the sepulchral temple of Deir-el-Bahri and the Ramesseum. The temples generally consisted of 5 prin. parts: (1) the pylon, 2 massive stone towers on either side of the doorway; (2) the courtyard, open to the sky in the centre. This was surrounded on 3 sides by a double colonnade, and led to (3) the hall of columns, lighted only by a clerestory, and having rows of columns down the centre. Beyond this is (4) the sanctuary, surrounded on 3 sides by (5) the halls of the priests. This style of temple continued with characteristic Egyptian features until the Ptolemaic dynasty. The most noteworthy points in the Egyptian style are to be seen as early as the Middle Empire, and continue almost unchanged, for the Egyptians seem to have had little power of initiative. First to be noted is the extreme proximity of the columns, which detracted extremely from the appearance of size in the interiors. These columns had capitals of kinds too numerous to classify, the most used, however, being the 'lotus' and 'palm-cluster' types. The temples regularly show curious batter-walls, the origin of which is quite uncertain. The arch was never used in construction.

*Assyria and Babylon.*—The 3 separate empires, the First Babylonian, the Assyrian, and the New Babylonian, were all remarkable for building activity, and all built in much the same style. During the early period, the prin. erections were temples which were built on the top of *ziggurats* or artificial mounds. These temples are sev. stories in height, the stories being built on receding terraces. These and the other structures, such as palaces, which were also placed on mounds, were constructed of sun-dried bricks, faced by burnt bricks and brilliantly coloured tiles. The whole surface of Chaldea is dotted with the remains of these temples, each on its *ziggurat*, but the most famous is that of Birs-Nimroud, which was either founded or rebuilt by Nebuchadnezzar, and which cylinders found on the spot tell us was built in 7 stories and was dedicated to the 7 planets. The Assyrian period was essentially a palace-building epoch, and its chief remains are the palaces at Nineveh, Nimroud, and Khorsabad. The palace of Sargon at the last-named place is one of the best examples of the general type. It was built on a terrace brick-work raised 48 ft. above the ground, and consisted of 3 main divs.: (1) the halls and general apartments

(2) the *barrem*, and (3) the offices and general service rooms. Apart from the building were the *ziggurat* and temple, and in the centre of the buildings was a large courtyard. In the case of the temple of Sargon, this courtyard was entered by portals which probably form the greatest creations of Assyrian A., flanked as they were by 10 winged human-headed bulls, some of which are now preserved in the Brit. Museum. Though externally the Assyrian decoration was of the simplest and most massive kind, yet inside it was more detailed. Stucco, *adobe*, bas-reliefs, and colouring were freely used. A remarkable feature of the buildings was their great length and extreme narrowness. This was doubtless due to the fact that the column was in little use in Assyria, whereas the arch was, and so consequently no width was allowed greater than could be spanned by a single dome or tunnel-vault. The Assyrian style, then, was in direct contrast with the Egyptian. In the one we have rows of columns, straight lintels, and flat ceilings; in the other an absence of columns, compensated for by the use of vaults and arches. The Assyrian had the greater influence, extending even to China. The temple at Jerusalem, the only historical monument of Jewish A., must, according to the biblical narrative, have been built on the Assyrian plan.

*Persia*.—Since the religion of Persia required no temples, and their customs were adverse to elaborate tombs, it is to their palaces that we must look for their architectural works. The first of these is the palace of Cyrus, erected at Pasargadæ in the sixth century B.C. There are but few remains left, and these show it to have been built on the simplest of plans. Later remains at Persepolis and Susa are more interesting. At the former of these towns, the builders made use of a natural platform on a range of hills, which they first enclosed with a stone wall. It was approached by a magnificent flight of steps at the N.W., each step being 22 in. wide, with a tread of 15 in. and a rise of 4 in. On this platform are to be found the ruins of the palace of Darius, the Palace of the Hundred Columns (also erected by Darius), and the palace and hypostyle hall of Xerxes. The last named is far the most important, and is, indeed, one of the architectural wonders of antiquity, for, though it consists only of a hall and 3 porticoes, it covers a greater area than any Gothic cathedral except that of Milan. The columns are 65 ft. high from base to capital. They are fluted after the Grecian model, and the capitals are of 2 kinds, the one double bull-headed and the other formed of an Ionic capital set on end over a lotus capital evidently copied from the Egyptian. Of the original number of 72 columns in black marble, only 17 are now *in situ*. At the head of the great stairway stands a propylæum, or entrance hall, flanked by immense human-headed bulls worthy to be

ranked with the Assyrian productions. After the erection of the great palaces of Persepolis and Susa, the hist. of Central Asiatic A. is almost a blank until the time of the Sassanian dynasty. We say almost, for one important monument of the Parthian monarchy has recently (1931-32) been investigated—the palace of El Hadr, in the valley of the Tigris. The city was besieged by Trajan in A.D. 116, and is mentioned then as a large city, containing a temple of the sun. This is probably the square building at the back of the palace. The remains show that the barrel-vault tradition was continued, but that the ornament was under the influence of the great W. styles. The first of the Sassanian kings came to the throne about A.D. 225, but no monuments of the next 100 years remain, at about which time we have the palace of Serbistan. This shows that the old Persian and Parthian traditions were continued, though an enlarged acquaintance with Rom. work is indicated by the improvements in the plan. Stone is to be found taking the place of brick, and the dome is introduced to cover the prin. portions of the building, such as the great hall in this palace. Other palaces are at Ctesiphon and Firuzabad, and these are formed on the Assyrian model, even more than that at Serbistan. The barrel vault, disused by the old Persians but revived by the Parthians, is used in all the chambers. The palace at Ctesiphon is built of brick, for it is situated in the S. plains near Bagdad, where no stone is to be found. It is, however, of far greater dimensions than the others. Its main front must have measured 312 ft., and its height must have been 115 ft.

*China*.—We have already noticed that the normal architectural styles are founded on the primitive hut, but that of China forms a notable exception. The early Chinese tribes were certainly nomadic, and their norm for buildings was the tent. The temples are no more than large houses. They are built chiefly of wood, and decorated in bright colours with tiles, etc., and the construction is remarkable in that the roof is not supported by the walls, but by a wooden framework. It is, in fact, put on before the panels of the wall are filled in. The complete structure strongly resembles an enclosed tent, and the appearance of a Chinese city is that of a vast encampment. Though the use of brick and stone has been known to the Chinese since very early times, these materials are not much in request. The Great Wall of China is the only great erection of stone, and that fails to come into the domain of A.

*India*.—The Indian styles must be divided into 3 distinct groups: the Buddhist, the Jaina, and the Hindu. The first of these comprises various classes of buildings, of which the chief are the *topes*, temples containing relics or marking a spot of peculiar sanctity,

and the *vihas* or monasteries. The symbolic sculpture is the point of chief interest about them. Columns are used, short and with a superabundance of ornament. The Jaina temples consist of a square shrine-cell, lighted from the door only, to which a large hall gives entrance. The hall with columns is so arranged as to support the weight of a large dome which rises from the cell. The sculpture is excessively rich, and the whole style is far lighter and more delicate than the Buddhist. The Hindu A. again subdivides into 3 classes: the N., Central, and S. Indian. These vary among themselves, but all bear a strong resemblance to the Jaina style. The S. (or Dravidian) style has the cell surmounted by a storied tower, instead of the curved pyramidal roof which is to be found in the N. The Central (or Chalukyan) style shares the features of the other two. Everywhere attention is given to detail rather than to the general appearance.

*Greece.*—The finished A. of Greece stands alone among the As. of the world in its entire perfection, and, as in the realms of literature, it is the Gks. pre-eminently who have ruled and guided the whole of Europe, so is it in A. But its development was gradual, and to this probably we owe its excellence. The Mycenaean period, sometimes known as the Cyclope or Pelasgic, differed considerably from the Hellenic period which followed it, but from the commencement of this latter (c. 700 B.C.) we see a gradual improvement in the application of the same principles. Simplicity, unity, and the harmony of minutely exact proportions are the characteristics of the final styles. Of the Mycenaean period, chiefly before 1000 B.C., but few monuments remain, and some date from the still earlier Minoan age. Of these last the prin. is the palace of Knossos in Crete, discovered by Dr. Arthur Evans. Other remains are at Argos, Mycenae, Athens, and Tiryns, at which place the palace was excavated by Dr. Schliemann. Only the bases of the timber columns are in position, but the material used is quite clear. The walls were built of roughly shaped masses of stone united, not by cramp-irons as later, but by clay mortar. From the Mycenaean tombs we learn that the arch, the absence of which is so conspicuous in Hellenic A., was perfectly well known. One is to be found at Cnidus, and another at Delos, the latter a triangular-headed opening formed by 2 inclined blocks. Among the earliest of the beehive tombs found around Mycenae is the so-called treasury of Atreus, which may be taken as an example of the general construction. It consists of 3 parts: the *dromos*, a long passage which gives entrance to the *tholos*, a large domed chamber; off this room is a small tomb-chamber excavated in the rock behind. The diameter of the *tholos* is about 50 ft., and the height is also about 50 ft. Somewhat

similar tombs have been found at Orchomenus, in Boeotia, and all are obviously modelled on the simplest form of hut. The famous Gate of Lions at Mycenae also belongs to this age. The Hellenic period dates from c. 700 B.C. till the Rom. occupation in 146 B.C., but the greatest masterpieces seem all to have been erected between 480 B.C., the date of the battle of Salamis, and the death of Alexander in 324 B.C. Since it was to their temples that the Gks. gave their highest work, it will be well here to give a short description of the plan on which they were built. The chief hall, called the *naos*, or cell, contained the statue of the god or goddess in whose honour the temple was erected. Behind this was another smaller room—the treasury. The two were of the same width, and thus formed an oblong. There was a portico both at the front and the rear, and the whole was surrounded by a colonnade. The temple, with its colonnade, was generally raised from the ground on a stylobate of 3 steps. The larger temples also contained rows of columns inside to support the roof. The simple span roof was terminated at the 2 ends by a triangular pediment above the façade, and this was usually filled with sculpture. The earliest to be developed of the 3 great orders of Gk. A. was the Doric, which, as we have seen, may possibly be traced to an Egyptian origin. In the most ant. of the temples, that of the Heraeum, at Olympia, the original timber columns were all gradually replaced by stone ones, and indeed in almost every part does the Doric column show its wooden origin. It follows the usual Gk. construction, containing internally a range of 8 columns on each side, of which the alternate ones are connected with the side by short walls. The columns were massive, and it is in the gradual lightening and increase of symmetry in them that the chief development is to be looked for. The temple of Athena at Corinth, generally dated 650 B.C., is equally massive, the columns again being monolithic. A little later are the temple of Selinus, in Sicily, others at the same tn. and also at Agrigento, Paestum, and Syracuse. At the beginning of the fifth century B.C. we have the temple of Zeus, at Olympia, peripteral hexastyle (i.e. surrounded by columns, the porticoes at each end having 6) in plan; and the so-called Thesion, now generally recognised as the temple of Hephaestus. But the highest point, both of conception and realisation, is reached in the Parthenon, the temple on the Acropolis dedicated to Athena Parthenos (Athena the Virgin). It was commenced in 454 B.C. and completed in 438, Ictinus and Callicrates being the architects. In plan it is peripteral octastyle (i.e. with 8 columns in each portico) and stands on a stylobate of 3 steps. Here are found in use the means used by the Gks. to counteract optical illusions. If the line of the shaft of a column were made absolutely

straight, it would appear concave; to remedy this, the column is actually made convex. The entablature, too, was raised some inches in a gentle curve, to counteract the illusion produced by the drop of the pediment, and this required a similar rise in the stylobate. The appearance of straight and stern simplicity which the trabeate style favoured was really secured by a combination of delicate curves. The columns, too, are not equidistant, but are placed closer together at the corners of the building, thus securing an air of great strength. The propylæa which gave access to the Acropolis were also of the Doric order, though slightly later in date than the Parthenon. The origin of the Ionic order is by no means so distinct. One of the earliest examples is the archaic temple of Diana at Ephesus, c. 550 B.C., and about 100 years later comes the temple of Niké Apteros (Wingless Victory) at Athens. The internal columns of the propylæa at Athens were of the Ionic order, but the most perfect example is to be found in the Erechtheum, also on the Necropolis, N. of the Parthenon. The slope of the hill, and the fact that it occupies the site of 3 anc. shrines, have caused curious irregularity in the plan, which is apteral (i.e. with no side colonnades). It consists of 2 shrines, of which the E. is dedicated to Athena Pallas, and the W. to Erechtheus and Poseidon. The shrine of Athena has a portico of 6 columns. On the N. leading to the shrine of Erechtheus is a porch with 6 columns (4 on the N. and 1 at each side), and on the S.W. is the famous caryatid porch, or tribune, probably the best application of this system of columnation. The temple of Diana at Ephesus was the most important temple in Asia Minor. Its remains were excavated by the architect Wood (1869-74), and many are now in the Brit. Museum. According to Pliny, it had 100 columns, of which 36 were sculptured, and it was probably on account of the magnificence of these that the temple, which had been rebuilt by Alexander the Great, was included among the seven wonders of the world. The Corinthian order, which is more ornate than the Ionic and Doric, was a late development, and was never much in use among the Gks. The chief difference lies in the capital, which is much deeper than in the other styles, and is filled with acanthus-leaf sculpture, normally 2 tiers of 8 leaves surmounted by volutes springing from stalks which rise from between the leaves of the upper tier. The earliest examples, however, show a perfection which can only have been arrived at after long preparation. The Choragic monument of Lysicrates at Athens dates from 335 B.C., and the Tholos at Epidaurus is probably somewhat earlier. The first mentioned is a monument erected to Lysicrates as a reward for his success in the choric dances. It consists of a stone base, on which is a circular marble

pedestal round which are 6 engaged columns. The flutings are peculiar in terminating at the top in the form of leaves. In the Tholos at Epidaurus, a small circular temple, a ring of 14 Corinthian columns is enclosed in a Doric peristyle, but only half-columns are to be found in the Philippeion at Olympia, a monument erected by Philip of Macedon, c. 338 B.C. Here, too, the peristyle is of another order—the Ionic. The Tower of the Winds, at Athens, so called from the sculpture on it, was erected c. 50 B.C. to contain a water-clock and sun-dial. It is octagonal in plan, and on 2 of the sides are porticoes with Corinthian columns, of which the capitals are plainer than the usual type. The most important of the Gk. Corinthian erections is the temple of Jupiter Olympius at Athens, which, though commenced 174 B.C., was not completed until A.D. 117, under Rom. influence. It has 8 columns at each end, and is surrounded by a double peristyle. The capitals are the finest specimens of the Gk. Corinthian order extant.

*Rome.*—Broadly speaking, there are but 2 principles on which A. can rest—that of the arch and that of the beam. The Grecian was the last and greatest of the trabeated systems; the Rom. the first of all the arched styles. The substitution of the Rom. arch for the Gk. lintel was the greatest revolution in the hist. of A.; and this principle derives from the earliest inhab. of Italy, the Etruscans, who exercised the chief influence on Rom. building until the conquest of Greece and the consequent plundering of their art treasures and the importation of their architects. The use of concrete we also owe to the Romans. The early Etruscan work was done chiefly in sun-dried brick, and so has mostly perished. Remains such as tombs, arches, bridges, and gateways show a close affinity with the Egyptian and early Pelasgic work. The Romans at first must have followed this, but no important buildings exist before 100 B.C., when the Gk. style was already introduced. The Doric order is hardly used at all, the Ionic rarely, and on the Gk. plan. But the Romans took up and developed the Corinthian style with vigour. Its ornateness accorded well with their ostentation and vulgarity. They also developed a composite order based on the Corinthian with the addition of an Ionic volute at each of the 4 corners directly under the abacus. It must be remembered, too, that the Rom. buildings were erected in all parts of the world which they conquered, and were not, as were all previous styles, confined to a comparatively small area. *Fora*: These served a variety of purposes. They were the prin. mkt.-places and were surrounded by shops, and later by the prin. temples and public buildings. Every tn. had its forum, and that of Pompeii was especially fine. Rome had sev. fora. The oldest was the Forum Romanum, to which were afterwards added the Fora of

Trajan, Julius Cæsar, Vespasian, and Nerva. Statues and triumphal arches frequently found a place in them. *Temples*: These were of 2 kinds, rectangular or circular, the latter kind being probably derived from Etruscan models. From the same source came the general use of the *podium*, a continuous pedestal upon which the temples were set. Access was given by a flight of steps leading to the front portico, where alone detached columns were set. The Rom. cella was much wider than the Gr., and was often filled with statues and other art treasures. The prin. rectangular temples in Rome of which remains still exist are

Maxentius and Constantine. *Thermæ*: The great public baths are a characteristic feature of Rom. civilisation, and they were largely built by the later emperors as bribes to the people. The remains and drawings made by Palladio in the sixteenth century show the general plan. There was a large central block containing the baths proper. Around this were open spaces for athletics, and then another ring of apartments consisting of lecture halls, theatres, etc. The thermæ of Caracalla and Diocletian, both at Rome, are the largest. *Theatres and Amphitheatres*: The only theatre at Rome



ST. CLEMENT'S, ROME

Anderson

those of Fortuna Virilis, Mars Ultor, Castor and Pollux, Vespasian, Antoninus and Faustina, Venus and Rome, and Saturn. At Nîmes is the *Maison Carrée*, at Spalato the temple of Æsculapius, at Baalbec the temple of Jupiter, and at Palmyra the temple of the Sun. Of circular temples the chief is the Pantheon at Rome. Others at Rome are the temples of Mater Matuta and Vesta; in the prov., the temple of Jupiter at Spalato and of Venus at Baalbec. The Pantheon, Corinthian throughout, consists of a huge domed rotunda, 142 ft. in diameter, in front of which is an octastyle portico. It is lighted by a single opening, about 30 ft. in diameter, in the centre of the dome. *Basilicas*: These were originally erected simply as courts of justice, but they soon became meeting-places where business could be transacted and where merchants could meet. They are interesting as the link between classic and Christian architecture. They were generally roofed with wood, and sometimes had internal rows of columns. The chief are the Basilica Julia, on the Forum, one of the most anct., the Basilica Ulpia, and the basilica of

is that of Marcellus. The theatre of Orange (S. France) has a stage 203 ft. wide. They were generally constructed on the slope of a hill to facilitate the cutting of the seats. The largest amphitheatre is the Colosseum (Rome), built by Vespasian and Domitian, consisting of a vast ellipse 620 ft. by 530 ft. *Triumphal Arches and Pillars*: The arches consisted either of a single arch, or of a large arch with a small one on each side. Of the first type are the arch of Titus (Rome), and those of Trajan at Ancona and Beneventum; of the second are those of Septimius Severus and Constantine at Rome. Trajan's column, of the Rom. Doric order, adjoining Trajan's basilica (the Ulpia), is the chief of the columns. *Tombs*: In accordance with Etruscan custom, the Rom. tombs were numerous. They were generally monuments, and were placed at the sides of the public ways. *Palaces*: Though only ruins remain, these show that the originals must have been vast and imposing. The greatest were the palaces of the Rom. emperors on the Palatine, while in the provs. that of Diocletian at Spalato is a fine example. *Dwellings*: Ideas of

the city dwellings of the Romans can be gathered only from Pompeii and Herculaneum, and here the scale does not seem to be so magnificent as Pliny would lead us to expect. They are mostly 1-storied, though we know that in Rome the houses were much higher. Hadrian's villa, near Tivoli, is the largest of which we have remains. Its grounds occupy some 7 sq. m., and it includes theatres, gymnasia, thermae, etc.

*Early Christian.*—The hist. of early Christian A. from the date of the Edict of Constantine (A.D. 313) to the time of Pope Gregory the Great is somewhat obscure. The early Christians were in the main poor people, and their churches must at first have been built in the cheapest and plainest way. Many of the pagan temples were converted into churches, but the statement that basilicas were so changed has been much controverted. Be that as it may, the general type of Christian church during the 3 centuries in question is distinctly on the basilican plan. The basilica consisted of a great hall divided by 2 rows of columns. There was an apse at each end, and in 1 of these was a raised platform, on which stood the magistrate's chair, and benches round the wall for his officers. In the church, the bishop occupied the place of the magistrate, the clergy the place of his officers. Instead of the E. apse, is generally found a courtyard or atrium, with a covered colonnade round. The general plan, then, is a simple oblong, but sometimes slight lateral projections occur between the main hall and the apsidal end. Among the early Christian churches at Rome may be mentioned the Lateran, which has now entirely lost its anct. character, the old St. Peter's, St. Paul outside the Walls, St. Clement's, and Santa Maria Maggiore. The circular temple was imitated in the baptisteries, which were then kept separate from the churches, and in the unique church of San Stefano Rotondo. This basilican A. was introduced into England, and united with the Celtic to form the A.-S. type. In Italy itself it fell with the Rom. empire, and for 2 centuries there is no definite style. The Romanesque style is developing. In the E., however, with Constantinople, the anct. Byzantium, for centre, a new type was rising.

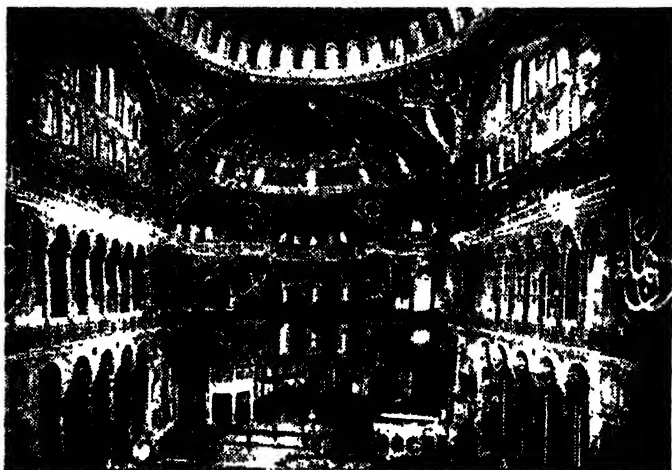
*Byzantine.*—The political separation between E. and W. at the end of the eighth century was intensified by the theological dispute on the Filioque clause in the Creed, and this finally separated the architectural styles of the 2 parts of Christendom. Yet before this time there had been differences, though the line of demarcation is not clear, and these are due to the influence of E. and Gk. architects and principles. The Byzantine style is characterised by the general use of the dome, placed, too, over square apartments, whose sides are brought to the circle by means of pendentives. Smaller domes were

frequently grouped round a large central one. Churches on this type are numerous from the time of Justinian. In A.D. 527 this monarch erected the church of SS. Sergius and Bacchus, but his greatest work was the church of St. Sophia (Holy Wisdom) at Constantinople, begun in 532 and completed in 537. It shows the high-water mark of the style, and has since been the general model for churches of the Gk. Orthodox communion. Further than this, imitations of St. Sophia form a distinct branch of Mohammedan A. The oval-ended nave is 265 ft. long by 107 ft. wide, and the centre is roofed by the great dome 107 ft. in diameter. To the W. of the building is the narthex, and beyond this the atrium, with colonnades as in the basilican churches. The walls were decorated with splendid mosaics and paintings which have been partially obliterated by the Muslims, who now possess the church, and who have made it into a mosque. Other early Byzantine churches are St. Irene, and the churches of the Theotokos and the Chora, all at Constantinople, and the church of the Holy Apostles, which, though utterly destroyed in the fifteenth century, is important as giving the plans for the church of St. Mark at Venice. Generally, the external appearance of Byzantine buildings is simple but picturesque, for all the constructional features are effective. Internally, the decoration is magnificent and highly coloured.

*Romanesque.*—The term covers the A. of the whole of W. Europe, which, growing up after the decay of the Rom. Empire, continued till the rise of the pointed arch in the thirteenth century. Though there are diversities in the separate countries, the main feature throughout is the round arch. Various methods of subdiv. are employed. The question of vaulting, too, is important. At first the Rom. barrel vault was used, but the difficulty of vaulting irregular oblique divs. and its great ugliness led to the introduction of groin vaulting and the insertion of transverse ribs which ultimately divided the space to be covered into a series of small compartments. Even in Rom. times (e.g. in Diocletian's palace at Spalato), the column had been allowed to bear an arch directly, instead of its being considered an inseparable part of its entablature, and this system is further developed under the Romanesque style. Since it was a development of the early Christian type, the basilican plan was at first in general use, but in the twelfth century this gave way to the cruciform plan. Square, octagonal, and circular towers are also a feature of Romanesque work. *It. Romanesque.*—The plan of the basilica is retained, and but few improvements are made. In the S., Norman and Saracenic influences are at work, and in the N., Ger. A strange effect is often produced in the plan by the extension of the transept, which is made very

wide, over the nave. This is well seen in the church of San Nicola at Bari, where the projection is very slight. The projecting porch is also a common feature. The cathedral of Monreale (Sicily) shows the general Sicilian style, which is under Norman and Byzantine influences. The walls are ornamented with mosaics and arabesque borders, over slabs of white marble. One of the finest examples of the A. of central Italy is the church of San Miniato, at Florence. It is divided longitudinally into aisles, and transversely into 3 nearly square divs.

always separate from their churches and have no buttresses or external ornament. They are broken only by the windows which light the staircase inside. *French Romanesque*: The disturbed state of the country during the early ages meant that no united progress could be made in building, and it is not until the time of Charlemagne that a school can be said to have arisen. Barbaric influences were also at work destroying the original Rom. form. The style developed somewhat differently in the S., where it was richer and more luxuriant, and in the N., where the



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BYZANTINE: INTERIOR OF ST. SOPHIA, CONSTANTINOPLE

by clustered piers which support great arches. This would seem to be a sign of the coming vaulting in compartments some feet above the nave, and is built over a crypt which is open to the nave. The roof, which sustained damage in the Second World War, is of open timber, gaily painted and gilded, and a feature of the decoration is the black and white marble panelling. Pisa Cathedral belongs to the same class. The transepts are now fully developed, and here have segmental apses at each end. The beauty of the cathedral lies more in internal decoration than in a logically developed style. The campanile, or leaning tower, and the detached baptistery are also noteworthy. The church of Sant' Ambrogio at Milan, which suffered severely from bombing in 1943, and San Michele at Pavia are the 2 most important buildings in the N. Italy or Lombard style. Others are Sant' Antonio at Piacenza, and San Zenone at Verona. The campaniles, or bell towers, are peculiar to It. art. They are

nearest approach was made to the coming Gothic. In the extreme N., the Norman style was developing. In the S., and particularly in the prov. of Aquitania, there are a number of small churches roofed with cupolas, but the most important domed church is the cathedral of Angoulême. It has a long aisleless nave, and is cruciform in plan. The nave is roofed with 4 stone domes, and there is likewise a dome at each end of the transept. The church of Notre-Dame-la-Grande at Poitiers (Anjou) is distinguished for its richness of decoration. *Ger. Romanesque* is frequently called *Rhenish*, for it was chiefly developed in the Rhine valley, and there its chief monuments remain. The system of vaulting was introduced much later than in the other countries, and probably the cathedrals of Spire and Mainz were the first Ger. churches where the system was carried right through, that is, about the eleventh century. The Romanesque A. also continued much later in the Rhine



valley, and, in consequence, the results achieved were superior in construction even to those of France. It has, indeed, much in common with the Lombard style, and shows much less variety than the Fr., because of the restricted area over which it extended. At the monastery of St. Gall in Switzerland a manuscript was found in the eighteenth century which gives a plan for a monastery. It seems to have been prepared by Eginhard, a friend of Charlemagne, and shows a church with nave and 2 aisles, with an apse at each end. Around the church are

beautiful sculpture. *Anglo-Saxon*: This period embraces all the architectural work that was done in England from the coming of Augustine until the time of Edward the Confessor, when that monarch began the building of Westminster Abbey, *novo edificandi genere*, as William of Malmesbury tells us. It developed in England from a combination of the Celtic and Rom. elements, and so 2 types of churches were used, the square-ended (Celtic) and the basilican apsidal-ended. Peculiarities of the A.-S. style by which it may be distinguished from Norman



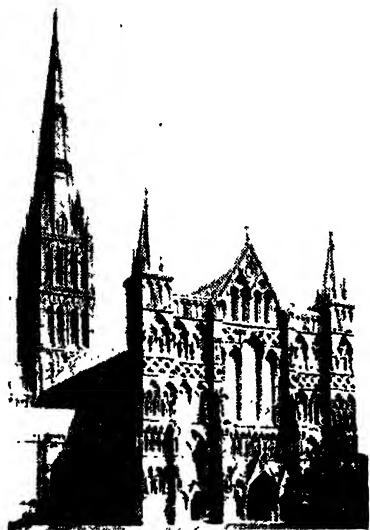
W. F. Mansell

#### ENGLISH ROMANESQUE: THE GALILEE CHAPEL, DURHAM CATHEDRAL

to be found the abbot's lodging, public school, guest-house, dispensary, refectory, dormitory, cloisters, etc. At Cologne a number of triapsidal churches are found, the 3 apses taking the place of choir and transept. Such are the churches of the Holy Apostles, and St. Maria im Capitol. The great cathedrals of Worms, Mainz, Trèves, and Spire are all worthy monuments of the eleventh- and twelfth-century Rhenish work. The Aachen Cathedral, originally built by Charlemagne, has been considerably altered in Gothic times. *Sp. Romanesque*: During the Romanesque and early Gothic periods the S. of Spain was under Moorish dominion, and the A. there was Saracenic. In the N. no great Romanesque church remains, for constant rebuilding has been in progress. San Isidoro at Leon, and San Vicente at Avila are late Romanesque, and show rich and

are these: (1) 'Long and short work,' which consists of laying long blocks of stone alternately horizontally and vertically at the corners of buildings and in door-jambs; (2) occasional triangular-headed arches and doorways; (3) the use of baluster shafts in windows, each head being cut out of a single stone; (4) windows with 2 splay, the window being in the centre of the wall, and not flush with the outer face; (5) Celtic scroll-work carving. The Saxon arch, where it exists, is always semi-circular. Specimens of Saxon work are to be found at Barnack (Northampton), Sompting (Sussex), etc. *Norman*: This is the second div. of Eng. Romanesque, and, as we have seen, was introduced before the Norman Conquest. It prevailed to the time of Henry II., when a period of transition set in, and the style began to approximate to the Gothic type known as Early

Eng. The pillars are generally low and massive, the arches heavy and round-headed. The capitals are large and with square abacus, the windows small and narrow with semicircular heads. The ordinary plan of the Norman church was cruciform with a low tower rising at the intersection of the nave and choir with the transepts. Sometimes there are aisles, and sometimes the E. end terminates in an apse. Doorways are frequently enriched with much carving and sculpture, a fine example being the W. porch at Lincoln Cathedral. Norman architects were much attached to arcades as wall decorations. Very frequently these are made to intersect, and this is believed by some writers to be the origin of the pointed arch.



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ENGLISH GOTHIC: SALISBURY CATHEDRAL

*Gothic.*—Almost simultaneously in France and England a change came over the spirit of the A. about the end of the twelfth century. The pointed arch, which had already appeared in isolated examples, comes into general use, and from this beginning came a radical change which can be summed up in a sentence. In previous styles the chief line was the horizontal, in Gothic it was the vertical. As the style developed there came too, a marvellous lightness. As the stately piles were lifted up to heaven they seem to have partially lost their earthly nature, to have become spiritualised and hallowed for their sacred purposes. The spirit of Gothic A. is in the truest sense the spirit of the Middle Ages,

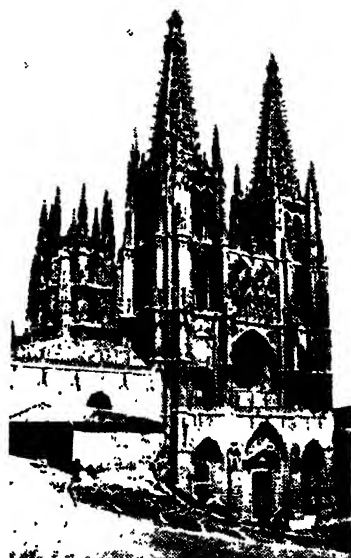
the spirit of faith and whole-hearted striving after God. The development proceeded on much the same lines throughout Europe, but it will be wise to deal with it in England somewhat more in detail. Here it is usually divided into the Early Eng. (1200-75), Decorated (1300-75), Perpendicular (1400-1575). Between each div. a transitional period of about 25 years intervenes, and it must be remembered that these dates are only approximate. *Early Eng.*: It has been said that Eng. Gothic art first sprang into being in the choir at Lincoln, under the inspiration of Bishop St. Hugh, and it was soon followed by the presbytery at Westminster. Yet for the first quarter of the thirteenth century, during the miserable reign of John, little other work was produced. Then came a triumphant burst of church building. The glorious cathedral of Salisbury was built throughout, and in the rest of the country there are few mighty minsters or par. churches that have not some evidences of Early Eng. art. The N. transept of York Minster, the nave and stately W. front of Wells, the choirs of Southwell and Beverley, Glasgow Cathedral, the W. front of Ripon, the 9 altars at Durham, the Galilee of Ely, the W. end of St. Albans are only a few of the noble creations of this period. Salisbury Cathedral is the most perfect example of Early Eng., for it was erected with no previous Norman structure to hamper the plan, which is that of a double cross, and there is a noble central tower and spire. The nave is long and narrow, with piers composed of clustered columns of Purbeck marble and detached marble shafts, surmounted by a triforium with trefoiled arches and a clerestory, with double lancet windows. At the E. end is a Lady chapel, extended behind the high altar. The chief peculiarities of this style are the pointed arches, piers composed of insulated cylindrical columns surrounded by slender detached shafts, dog-tooth ornament, lancet windows, and a peculiar bell-shaped capital with stiff-leaved foliage. *Decorated*: This is the highest development of Gothic A. in England, the summit which had to be followed by decline. This stiff-leaved sculpture became more natural. New forms of expression were found. Yet the fourteenth century brought with it much elaborateness, and this developed into an extravagance of idea and execution which destroyed the simplicity of the early work. There was a love, too, of width and openness as well as of height. Windows are made wider, and the arches are wider spaced. The naves, too, are made less long and narrow. The tracery of the windows becomes almost a separate dept., and bewildering beauty and variety are found. During the early part of the century the tracery is largely geometrical, composed of figures such as circles and trefoils, but, as the style advances, it becomes flowing and reticulate. Famous windows of this period

are the W. window at Exeter, the E. at Carlisle, the W. of York, and the E. of Lincoln. In large churches the triforium story is now omitted and the clerestory windows are increased in size. Another feature of the Decorated style is the form of piers, composed of 4 or more semi-cylindrical piers, not detached, but united without any band. Roll-mouldings are common, and the ball-flower ornament is peculiar. The bell-shaped capital is retained, but the foliage is elaborate and the lines are natural. *Perpendicular*: While on the Continent the A. was degenerating into the Flamboyant (so called from the flame-like waves of the window tracery), in England it developed into the Florid or Perpendicular. Perhaps the earliest sign of change is observable in Gloucester Cathedral, where we see the panel-work and the large windows with their straight-lined tracery. It is from this peculiarity that the style derives its name. The mullions are now vertical, carried straight up through the head of the window, and not branching out in curved or flowing lines as in those of the previous style. The windows are still larger, and afford the glass-painter a greater field for his picture-work. The large lights are frequently divided by transoms which form a series of lower compartments resembling panelling. It is needless to give examples of these developments, for almost every old church and cathedral of the country exemplifies most of them. The triforium is now quite abandoned, and the general form of the piers is octagonal with polygonal base mouldings. The roofs are flatter, and the mouldings in particular show the degeneracy of the workmen, due partly to the Black Death. They are shallow and hard, a favourite being the cavetto, with a 4-petalled flower something like the ball-flower. Fan-tracery is also developed—a form of vaulting which is composed of pendent semi-cones covered with foliated panel-work. A good example is in Henry VII.'s Chapel, Westminster. Throughout the vaulting is intricate and peculiar. *It. Gothic*: The influence of the old Rom. forms naturally continued far longer in Italy than in the rest of Europe. The Romanesque here was more classical, and the churches regularly retained the old basilican plan. In the same way, Gothic never became one of the true It. styles; the Romanesque continued late and the Renaissance came early. The sculptures are better than in the N. countries, but are less symbolical. Colour is freely used, for the marbles of N. and Central Italy supplied abundant material. The use of brick is another feature of the It. work, for there were large parts of the country where no stone could be obtained. Milan Cathedral is the most important Gothic work in the country, and this is definitely under Ger. influence. It was commenced in 1385 by the first duke of Milan, and consecrated in 1418. It is the greatest in size of the medieval

cathedrals with the exception of Seville. In material it is the richest, being constructed throughout in white marble, and the decoration is most gorgeous. Externally it is covered with bewildering tracery, a mass of pinnacles, spires, and statuary glittering in white. Yet, with all this, the building cannot compare favourably with any of the great N. cathedrals. The true Gothic conceptions of the Ger. architect prevailed only in the details, and the plan and general appearance are clumsy. In plan it consists of a nave with 2 small clerestories. There are 4 rows of columns, giving 2 aisles on each side, and the nave terminates in a Fr. circle of columns, enclosed in a Ger. polygonal end. The result is a compromise between the Fr. *chœur* and the Ger. or It. *apse*. Over the central part of the nave is a vault crowned with a lofty spire erected in 1440 by Brunelleschi. Thanks to the architect, the columns are placed much closer together than in most It. work, and the ugly pseudo-Classic capitals are replaced by niches filled with statuary. It had little damage in the Second World War. But It. Gothic improved more rapidly in the secular than in the religious buildings, and a particularly good example of civic art is to be found at Venice, the great merchant city of the Middle Ages, wealthy and powerful. The Doges' Palace or Ducal Palace was erected in the fourteenth century, but the W. face was burnt down, and later rebuilt in imitation of the rest of the building. Each façade consists of an open arcade of 2 stories, and the carving of the capitals is justly famous. The cathedral at Florence shows the wide spacing of the nave arcades already referred to. It was commenced in 1294, but it was not till 1420 that the dome was added. The ground plan is magnificent. A vast nave leads to an enormous octagonal dome, and this is finished by the triapsal end so common at Cologne. It is in the imperfect proportion of the separate parts, and especially in the size of the nave arches, that the cathedral fails. *Fr. Gothic*: In the S. of France Gothic art never reached the heights it attained in the N., and it is in Normandy and the Ile-de-France that the best work was done. The main principles were the same as in other parts of Europe, but the Fr. accentuated the vertical lines by giving their buildings great internal height by the extensive use of spires, pinnacles, and flying buttresses. The great cathedral-building age was the first half of the thirteenth century, and this synchronises with an outburst of crusading zeal. The laity bore the greater part of the expense, and the buildings were not primarily monastic. The 4 great cathedrals of France, are those of Paris, Amiens, Chartres, and Reims, and of the 4, that of Paris is the oldest. It was commenced in 1163, and completed in 1214. The plan consists of a wide nave, with double aisles which are carried round the *chœur* end, peculiar

to Fr. buildings. The transepts have hardly any projection at all over the side aisles. The W. front consists of 2 huge towers forming the grandest of cathedral façades. The insertion of chapels has spoilt the buttresses. Amiens Cathedral is generally considered as the most typically Fr. in plan, and so is often used for comparison with Salisbury as a typical Eng. building. The plan is fundamentally the same as at Notre-Dame (Paris), but the transepts project further and the *chancel* end has a number of small apses. The enormous height of the interior detracts from the effect of the exterior. The 2 W. towers, which make the façade similar to that of Paris, though taller than those of York, are dwarfed by the huge roof behind them. The spire suffers from the same cause, though it is taller than Salisbury spire. Chartres Cathedral is more irregular in plan than the other 2, and its transepts are more strongly marked. There is only a single aisle on each side of the nave, and the width is too great in proportion to the height. The 2 spires at the W. end are the finest of their kind in France. The S. one is plain, but excellently designed, and the N. is of great richness. The original intention was to have erected 8 towers, 1 on each side of the choir, 2 at the E., 2 at the W., and 1 at the end of each transept, but only the W. 2 have been completed. The façade at Rheims is very similar to those at Paris and Amiens, but a row of statues takes the place of the open tracery of Notre-Dame. The absence of the side chapels so often added to the original plan improves the nave, and a wonderful effect is produced by the broadening out of the choir to the width of the transepts. The civic buildings, palaces, and castles of the time form a distinct class, but it is impossible to treat them here. The most famous dwelling-house of the Middle Ages is that of Jacques Coeur at Bourges. All that remains of the royal palace at Paris is the Sainte Chapelle, a Gothic building which shows the huge windows of the N. Ger. Gothic: We have already seen that the Romanesque style continued in use much later among the Gers. than among the rest of the builders of Europe, and when, at the end of the thirteenth century, the Gothic style appears, it is not a development, but a foreign importation. Cologne is the great cathedral of Germany in which all its virtues are summed up. It is built on the plan of Amiens, but the aisles have been made double, one bay has been taken off the nave, and one added to the transept. It is the largest cathedral of N. Europe, covering an area of 91,464 sq. ft. The length is 468 ft. and the width 275 ft., but the actual width of the nave between the pillars is 41 ft. 6 in., whereas the height is 135 ft. This proportion hopelessly dwarfs everything in the building, and the relative shortness spoils both the internal and the external

effect. Everything else is designed with such mechanical correctness that the poetry which is the charm of the Fr. cathedrals seems entirely crushed out. This applies with particular force to the spires, which at the W. façade rise to a height of 510 ft. The open work in the spires, characteristic of Ger. Gothic, is here carried to an extreme. Many have thought that the dignity of the spires is detracted from by the profusion of tracery, and in this respect



W. F. Mansell

## BURGOS CATHEDRAL

An example of florid Gothic architecture in Spain.

Freiburg Cathedral, with its smaller spire, is finer. A still more splendid spire, with less open tracery, is to be found at St. Stephen's, Vienna. This church is singular in having no clerestory or triforium, and in having the 3 aisles nearly equal both in width and in height. Secular A. is again important, and many fine castles, town halls, and gateways date from these centuries. Sp. Gothic: The Spaniards never succeeded in developing a national type of A. for themselves, but regularly borrowed from other countries. The predominating influence was Fr., though this was later replaced by Ger. and It. At all times the Saracenic influence of the S. is apparent. Toledo Cathedral shows one peculiarly Sp. feature—the intrusion of the choir into the nave, i.e. its situation to the W. of the crossing or

transept. It shares with Cologne the defect of excessive shortness, but here it is partly remedied by decreasing the height. In plan it is 5-aisled, with apsidal end. But the greatest cathedral of Spain and the largest mediæval cathedral of any country is that of Seville. The structure is peculiar, and the plan is quite un-Gothic, for the cathedral was erected on the site of a mosque, the outline of which it followed. It is rectangular, with a nave and double aisles, and follows the usual Sp. arrangement for the choir. The nave is 55 ft. wide, and each of the aisles spans 10 ft., the total width being 298 ft. *Belgian and Dutch Gothic*: Wedged in as they are between Germany and France, these 2 countries partake of the nature of their neighbours. The Belgian A. is Fr. with a slight admixture of Ger., while Holland is chiefly affected by Germany. Neither country retains much trace of Romanesque work. The finest cathedral is that of Tournai, the nave of which is Romanesque, while the transept, with apsidal ends, was added in the twelfth century in a transition style. In the fourteenth century the old choir was taken down and a new one with *cheret* end built in fully developed Gothic style. Other interesting churches are the cathedrals of Brussels, Antwerp, and Bruges. In secular work the building of town halls, chief of which are those of Brussels, Bruges, Louvain, and Ghent, was carried to its greatest height.

*The Renaissance*.—The movement known as the Renaissance, or 'New Birth,' arose in Italy in the early part of the fifteenth century, though its harbingers are to be seen during the century before. Its causes were many and various, and its influence may be traced in all the arts and not less in religion. Classic literature may almost be said to have been rediscovered. Gk. scholars from the E. seem to have foreseen the approach of the fall of Constantinople, the cap. of the E. empire, and to have migrated westward. When in 1453 the fall actually came, a general exodus took place. But the return to classical forms is found in every dept. of art, and in A. it was hastened by the discovery of an architectural treatise by Vitruvius, a Lat. author of the first century B.C. This gave rules for building and the proportions for columns, etc.; but since Vitruvius himself had never visited Greece, and was only acquainted with Rom. examples, these were often incorrect. The book possessed no illustrations, so in Italy itself the lack of these was supplied by the inspection of those monuments of the empire which still remained. Italy was, of course, the centre of the new movement, whence it spread over the whole of W. Europe. The main features in the style were the Classic orders, the 4 Rom. orders being used with the addition of a fifth, the Tuscan, which

was a debased Doric form. Yet the style was not entirely imitative, and it was in Italy itself that the greatest freedom was used. The architects were artists before all, and the abundance of old Rom. work about them enabled them to dispense to a great extent with the authority of Vitruvius, which became somewhat too despotic in the rest of Europe. Generally, although important types of church design were developed, the chief energies of the time were devoted to the evolution of a civic style. *It. Renaissance*: Three schools are broadly distinguished in this country, the div. being largely due to social and political causes. By this time the personality of the architect becomes the main factor in the work, whereas in the Gothic buildings the result was achieved by the perfect harmony of many minds working on traditional methods. The *Florentine School* produced the great Brunelleschi (1377-1416), who may be considered as the leader of the movement. His prin. work was the dome of Florence Cathedral, to which reference has already been made. Brunelleschi was associated with Michelozzo in the great secular edifice of Florence, the Riccardi Palace, notable not only for its size, but also for the enormous blocks of rusticated masonry of the lower part, which give an air of great ruggedness and solidity. The other great Florentine architect was Leone Battista Alberti, whose writings on the subject had great influence. His largest work is the church of Sant' Andrea at Mantua, where the front is on the model of a Rom. triumphal arch. The *Rom. school* owes its development largely to the patronage of the popes, whose return from Avignon had taken place at the end of the fourteenth century. The first great Rom. architect was Bramante, and it was he to whom the designing of St. Peter's at Rome was originally given. Sangallo, Raphael, and Peruzzi followed him, and finally Michelangelo took up the work. The original plan was a Gk. cross, but the addition of the 3 more eastward bays to the nave has practically made it a Lat. cross. The bays of the nave are of immense size, and over the central crossing towers the enormous dome, 140 ft. in diameter. The interior has gigantic pillars of the Corinthian order, over 100 ft. high, crowned with barrel vaults of the old type. To the W. is the noblest courtyard in Europe. The Rom. palaces gain much by their simplicity. The *Venetian School* evolved somewhat differently from the other 2, partly because of its greater distance from Rome, and partly because it already had a Gothic style of its own, which continued in use till near the end of the fifteenth century. Between the 2 periods is to be seen one of transition, where Renaissance detail only is used. Examples of this are to be found in most of the palaces. Venetian work is generally graceful and light. The library of St. Mark, erected by Sansovino

and completed by Scamozzi, is the greatest work in this style. The façade consists of a lower open arcade with Doric columns, over which is a glazed arcade of Ionic columns. The whole is surmounted by an entablature spoilt by disproportionate size. The greatest eccles. work was Santa Maria del Miracoli by Pietro Lombardo. *Fr. Renaissance:* The invasions of Italy by Charles VIII. and Francis I. hastened the dispersion of the It. ideas, and led to the general introduction of It. workmen, whose influence on detail is immediately noticeable. Where It. workmanship is absent, the Flamboyant, or decadent Gothic, is to be found holding uninterrupted sway. In the Château de Blois, erected by Louis XII. and Francis I., the transition is to be seen. A more typical example of the ordinary Fr. castle of the time is that of Bury, near Blois. In the centre is a large courtyard with buildings on 3 sides. The fourth side is closed with a wall, in the middle of which is the entrance. The side opposite to this forms the main body of the building, the other 2 sides containing servants' rooms, stabling, etc. Beyond the main body is the garden, and at each corner of the large square is a tower. At the palace of Fontainebleau the chief interest lies in the magnificent adornments of the interiors. The greatest secular work of the Renaissance in France is the Louvre at Paris, and, since its construction was continued from the time of Francis I. to that of Louis XIV., it contains an almost complete hist. of the progress of the style. The building is arranged round a courtyard, 400 ft. square, but the first architect, Pierre Lescot, had intended a courtyard only one-fourth of that size. Two orders of columns are used, the lower Corinthian and the upper Composite, and a number of pilasters adorn a third attic story. The Tuileries Palace, at Paris, is quite near to the Louvre, and is built in the same style. The difficulty of connecting the 2 took some years to solve. *Fr. eccles. A.* first shows the It. influence in tombs, pulpits, altars, and then in additions to churches. It never became so important as the secular, though some important churches employed it. The church of St. Eustache at Paris is structurally Gothic, but all the details are Renaissance, and the same remark applies to St. Etienne du Mont, though here the Gothic element is stronger. The Panthéon and the Madeleine are examples of true Renaissance work. The former was originally intended as the church of Ste. Geneviève, patron saint of Paris, but its aim was changed during the Revolution, and though the building has been reconstructed on 2 occasions, it is now estab. as a burying-place for the famous dead of the nation. It has a triple dome, and the columns used are Corinthian. The plan is a Gk. cross. *Ger. Renaissance* was introduced from France about the middle of

the sixteenth century, and here again it combined with the last phase of Gothic to form a transition period. The A. is almost entirely secular, for hardly any new churches were erected during or after the Reformation period. The Gers. seem to have given their chief attention to the ornament, of which the gable ends generally receive a large share. This is characterised by grotesqueness and distorted quaintness, which, though generally crude and without refinement, are often very picturesque. Heidelberg Castle is the best-known work, and it suffers considerably from this fault of over-ornamentation. The style seems halfway between the more refined Fr. which it copied and the heavy Elizabethan Eng. At Cologne, the Rathaus had a Renaissance porch, showing traces of Gothic. The pillars were Corinthian, but the arches slightly pointed. It was perhaps, the most pleasing production of the period in Germany. Among very late secular work may be mentioned the Brandenburg gate, Berlin, and the only churches to be mentioned are St. Michael, Munich, and the Frauenkirche (in ruins), Dresden. (See further under BERLIN, DRESDEN, etc.) *Sp. Renaissance:* Except for the Moorish influences, the style here is almost the same as that of France, and followed the usual development, in first becoming more classical and then falling away into a Rococo style. It was, if possible, richer here than in any part of Europe, for Spain naturally loves display, and she was then at the height of her power. Secular examples are many, and stretch over the whole of the 3 centuries during which Renaissance A. existed, and whereas in France the best examples are to be found in châteaux and mansions scattered throughout the country, in Spain the towns received most of the buildings, many of which were univs. and monasteries. The earliest known work is Charles V.'s palace, commenced in 1527, and erected at Granada, near to the Alhambra. The building is an exact square, 205 ft. each way, and encloses an open circular court 100 ft. in diameter which was surrounded by an open colonnade in 2 stories, the lower columns being Doric and the upper Ionic. The palace of the Escorial, near Madrid, is chiefly famous for its immense size, for it comprises palace, monastery, college, and church all in 1 plan. The grand entrance leads into a central courtyard, with the college on the right, the monastery on the left, the church immediately opposite, with the palace behind. Among the eccles. edifices of the time may be named the dome of Burgos Cathedral, Granada Cathedral, and Valladolid Cathedral, in all of which the greatest amount of work has been lavished on the magnificent portals. *Belgian and Dutch Renaissance:* The most notable example occurs towards the end of the sixteenth century, and it was not before that time that the style began to be much in use. The remarkable development in Gothic

for the erection of town halls hindered the introduction of anything new. The town hall at Antwerp is the characteristic work. It was designed by De Vriendt in 1565, and owes its origin directly to the wealth and prosperity of the great seaport and trading centre. The length of the façade is 300 ft., and the height is divided into 4 stories, the lower one being composed of a deep arcade. The design is extremely plain, the chief ornament being in the centre, where detached columns are placed before each window, and a pediment crowns the whole. It is

teenth century came the true Anglo-Classic style of which the chief heads were the architects Inigo Jones and Sir Christopher Wren. Inigo Jones, the favourite of James I. and Charles I., had been familiarised with classical models by a long stay in Italy, and his genius would doubtless have shown itself more clearly had not the Commonwealth intervened. His banqueting hall at Whitehall is all that was erected of the royal palace, which was one of the most magnificent conceptions of the Renaissance. Scope was given to Wren's genius by the Great Fire, which offered



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#### BLICKLING HALL, NORFOLK

Jacobean house (1620), essentially in the English tradition.

hardly necessary to notice eccles. work, the prin. church being that of St. Anne at Bruges. Throughout the 2 countries it was to the town halls and the other public edifices, such as the Palais de Justice at Brussels, that chief attention was given. *Eng. Renaissance:* In England the movement by which secular A. took the place of eccles. was temporarily hastened by the destruction of the monasteries under Henry VIII. and the consequent appropriation of their revenues. Elizabethan A. shows the transition from the Perpendicular Gothic, of which many features are retained. The chief examples of this style are the country houses, many of which still remain, and the Elizabethan colleges at Oxford and Cambridge, such as Jesus and Wadham at the former and Emmanuel at the latter. Special features in the country houses are the great hall, the broad oak staircase, and the long gallery on the upper floor. The Elizabethan developed naturally into the Jacobean style by the gradual dropping of Gothic details. Then in the seven-

him a unique sphere of work. His prin. work is St. Paul's in London, of which the plan and execution are too well known to need much description. The plan is of the original medieval type, and the internal columns are Corinthian. The base of the dome has a diameter of 109 ft. Externally it is one of the finest in Europe. Wren was also the architect of about 50 city churches, and many secular buildings, such as Chelsea Hospital, part of Greenwich Hospital, and the Temple, London. During the next 2 centuries the Classical style became more and more used for general purposes, under a succession of architects whose names are well known. Nicholas Hawksmoor was a pupil of Wren, and was a contemporary of Sir John Vanbrugh (1664-1726), in conjunction with whom he worked in the designing of Blenheim Palace, distinguished chiefly by the striving after symmetry and monumental grandeur which causes the debasement of A. Other names are those of James Gibbs, the brothers Adam, James Wyatt, Sir John Soane, and Sir William

**Chambers.** The last-named was the architect of Somerset House, London, which is grand, simple, and dignified throughout. Soane was the architect of the Bank of England. Before dealing shortly with the question of present-day A., one other style remains of which mention has already been made in connection with Spain.

*Mohammedan A.*, sometimes termed Saracenic, extended everywhere with the Mohammedan religion, for it is a religious rather than a national growth,



Anderson

MOHAMMEDAN OR SARACENIC:  
THE ALHAMBRA, GRANADA

though in the various nations it differs widely in treatment and detail. The religion prescribed the plan of the mosques, and these were the principles of the earlier work. The typical mosque consists of an open courtyard surrounded by a colonnade, which is deepest on the side towards Mecca and opposite the entrance. Somewhere near the entrance is the minaret, from which the muezzin calls the faithful to prayer. Another type of mosque is founded on the Byzantine church plan, and especially on the church of St. Sophia, which is now a mosque. Decoration is mostly geometrical, for the use of all natural objects is prohibited. Mohammedan A. is generally subdivided according to the various nations where the 'Saracens' have settled, i.e. into Arabian, Syrian, Egyptian, Sp., Persian,

Turkish, and Indian, and these naturally vary in importance. The Sp. may be mentioned particularly because it includes the best-known Mohammedan palace in Europe. The Alhambra, Granada, the most renowned of all Saracenic erections, dates almost entirely from the early fourteenth century. It consists of 2 oblong courts, of which the earlier, the Court of the Lions, is the more elaborate. It measures 115 ft. by 66 ft., and has been described as 'the gem of the Arabian art in Spain.' Other buildings which may be mentioned are the mosque of Cordova, the Sullimaniyeh in Turkey, and the mosque of Kait-Bey near Cairo. The chief feature of Mohammedan work is, as has been said, the geometrical tracery, often of a most intricate kind, and other features are the tall graceful minarets, the various pointed, horse-shoe, multi-foil, and ogee arches, and the pear-shaped eastern domes.

*Modern Architecture.*—From time immemorial almost, the materials of building had remained practically the same and identical all over the world: mud, wood, wattle, brick, and stone. Similarly, the styles of building have a long evolutionary hist. with affinities due partly to the nature of the materials employed, but in part also to evolutionary development. In Europe there were thus for the last 300 or 400 years only 2 styles in A. as distinct from local traditional building—namely, the Gothic and the Classical. Upon these 2 styles the architects, academically trained, had rung the changes by modifications, adaptations, combinations, none of which, however, resulted in the creation of a new style. At the commencement of the twentieth century, however, prompted in part by the preaching of Ruskin and the precept of William Morris, a certain craving for 'honesty' and 'simplicity' began to make itself felt, a desire to let the building materials assert themselves as such: honest brickwork, not stucco pretence, for example, and honest woodwork, especially in interior decoration and furniture, instead of gilding, painting, and veneer. Amongst the pioneers of this movement were the architects C. R. Ashbee in England and C. R. Mackintosh in Scotland. For whilst these tendencies brought about some changes, they did not in themselves constitute a radically new departure. This new departure, however, was made, again in England, as far back as 1850 when Mr.—later Sir—Joseph Paxton (1801-65) designed the building of the Great Exhibition in Hyde Park, re-erected as the Crystal Palace at Sydenham in 1853-54. The Crystal Palace, almost completely destroyed by fire in 1936, was a structure of iron and glass, an entirely new combination of building materials, and one moreover that depends for its existence on an industrial basis such as had theretofore never existed. The material, the form, and the area of this huge structure were in style unlike any A.



that had preceded it. Actually it was nothing more nor less than a huge conservatory—Paxton was not only an architect, but also a gardener. The building was 1608 ft. long; of its 2 transepts 1 was 175 ft. from the floor, and its 2 water-towers were 282 ft. high; in them the first lifts were installed; the area of the whole structure covered 603,072 sq. ft. Thus the Crystal Palace tackled architectural problems which in many ways anticipate the problems the modern engineer-builder has to solve; but which in no way resemble those of the traditional architect. Truly modern building is, in fact, a form of engineering, and depends pre-eminently on the machine and its building products, iron, glass, and reinforced concrete. This latter material was invented by Francois Coignet in 1861, but did not come into general use until 30 or 40 years later. The next great landmark of modern A. is again an engineer's construction—namely, the Eiffel Tower, built by Alexandre Gustave Eiffel in the Champ de Mars in Paris in 1889. It is 984 ft. high and consists entirely of interlaced ironwork. Eiffel dealt with the vertical problems of modern building and its lofty construction anticipated what has become a *sine qua non* of the modern sky-scraper. Whilst in England the work of the local builder and the academically trained architect continued, and even still predominates, economical considerations and industrial developments forced upon the continents of Europe and America the adoption of the new building materials and the construction of buildings that have in their æsthetical significance little if any connection with the A. of brick and stone. In the new iron-constructed building, even the stonework, when it is used and given traditional form, is only a *facing* that has no structural part in the building as such. But the continental builders or engineer-architects are guided in the first place by economic, in the second place by strictly utilitarian considerations, their æsthetics being based on the principle that what is strictly useful must *therefore* also be beautiful. Whilst this principle is, to say the least, doubtful, it cannot be denied that the A. based upon it is often entirely unprecedented in its forms and occasionally impressive in its appearance. Characteristic of this new A. is its entire disregard for, or better expressed, its independence of, the traditional forms of æsthetics due to the totally different method of construction and the predominance of economical considerations which are ethically justified by the pretence that ornament as such is 'romantic' and irrelevant. In the earlier U.S.A. sky-scrapers such as the Woolworth building, 792 ft. high (architect Gilbert), or the Standard Oil Building (architects, Carrère & Hastings) irrelevant Gothic and classical elements were still precariously if conspicuously associated with the steel frame; in more recent

constructions, such as the Graybar Building (architects, Sloan & Robertson), all ornament has disappeared, and A. has resolved itself into an erection of superimposed cubic forms, but with a swift advance to even more striking and dignified types. (See below.) These cubic forms are also associated with the new A. of small dwelling-houses built of reinforced concrete, of which Le Corbusier and André Lurçat are the foremost exponents. Here we have, instead of the vertical arrangement of 'voids'—that is, openings in the façade of the building—a horizontal arrangement. A combination of the vertical with the horizontal arrangement of voids may be seen in the New Olympia Building (architect, Embleton). Further developments of the new A. are the cubes of the Rue Mallet Stevens in Paris named after their architect and which with their flat roofs give the quarter an almost oriental appearance, not aimed at, but the result of modern economical construction. The over-emphasis of uninterrupted horizontals gives the sensation of an endless solid, not resting, but travelling upon voids. Such is the case especially with continental architects, whose new flats and business buildings seem destitute of æsthetic logic, which demands a visible support for every horizontal. It is a sense of movement, of dynamic rather than static qualities, which often gives this new A., of which perhaps Bruno Taut and Erich Mendelsohn in Germany are the prin. exponents, the appearance almost of ship decks of modern men-of-war. The strongest tendency in Ger. A. before the Second World War was to evolve an entirely new style founded on the principles and materials of modern building construction. This style manifested an obvious bias towards unbroken horizontal lines and continuous rows of windows, giving a striped effect in concrete and glass. Some examples of typical modern Ger. buildings were the Chile Haus at Hamburg; the headquarters building of the Ger. Dye Trust at Frankfurt-on-Main, in which architectural effect was acquired through proportion and balance of masses; Shell House, Berlin, a steel shell, interlaced with travelling between the windows; the Laubenganghaus, a tenement block at Reinickendorf; and the Karstadt Dept. Store, a striking example of Amer. 'verticalism' and notable for its purity and its absence of superfluous decoration. (Most of these buildings were either totally destroyed or very severely damaged in the air raids of the Second World War.) By far the most interesting and æsthetically satisfying results these new constructional principles have evolved are to be found in some typically modern purposes, such as hangars, radio stations, and factories of different kinds. Of such may be mentioned the radio station at Kootwijk in Holland, the hangar for dirigible airships at Orey (architect, Froyssinet), the cabinet factory of the Gramophone

Company at Hayes (architects, Wallis Gilbert & Partners), the grain elevators at Montreal, Canada, the refuse converter at Cologne (architect, Mehrtens, Cologne), etc. Efforts to give dignity to these modern principles, in cases where more than practical use is of importance, have, so far at all events, hardly succeeded. One of the best efforts in this respect is the new Horticult. Hall, Westminster (architects, Easton & Robertson), which, though devoid of ornament, has, by reason of the arrangement and proportions of the structural members, especially in its interior, a decidedly pleasing æsthetical effect. More daring are the efforts made by the Fr. architects A. and G. Perret and the Swiss architect Karl Moser of Zürich, with a view to imparting to ferro-concrete and glass the dignity of the old stone-built churches. Messrs. Perret's church of Ste. Thérèse de l'Enfant Jésus at Montmagny has for walls a kind of patterned and pierced screens or *grilles*, and makes, both outside and inside, a vaguely Gothic, but 'meagre' impression. Karl Moser's church of St. Antonius at Basle still suggests a factory building with a chimney rather than a tower. That there is now quite definitely, and owing to similar economical pressure all over the world, an international style of engineer-A. in the making there can be no doubt; but until economical considerations, such as the standardisation of the material demanded by its machine production, and other time-, money-, and labour-saving factors which are now regarded as of primary importance, are put into their proper subordinate place a new style of pure A. is hardly to be expected.

This, however, is an experimental period in which some see, in the more modernist buildings of N. Europe, the dawn of a new A. In England modernist A. looks not to Amer. models, which are adapted to conditions and problems of a special nature, but rather to those of Germany and Holland. The Dutch have originated new ideas in designing large blocks of flats—designs in which the colour and texture of the brickwork are essential features. Everywhere in both Holland and Belgium are to be found very striking effects achieved by original methods of bricklaying, which owe much to the original genius of De Klerk. In the Netherlands, too, was found, for the first time, the A. of reinforced concrete. Buildings constructed and finished in reinforced concrete are made in a mould, instead of being built up of small blocks, and it is this process which gives them a character so different from what we have been accustomed to see. Two of the more outstanding examples of these plastic or non-angular forms of A.—buildings which are the very antithesis of the old types of flat surfaces and hard angles, are the Einstein Tower at Potsdam and Luthman's wireless station at Kootwijk. In these 2 buildings the well-grouped parts are co-ordinated in a mass which almost

suggests a national memorial rather than a utilitarian building, and the clean lines suggest both power and efficiency. Another example of the grouping of simple spacious masses is seen in the bath-house at Hilversum by Dudok, which is also a brick-built building. In Sweden, modernist A., though original in treatment and effect, is not revolutionary, but reveals obvious links with past styles. The city hall, Stockholm, by Ragnar Östberg, has affinities with the civic palace of Venice, and architectural students regard it, together with the Liverpool Cathedral, as one of the architectural triumphs of the twentieth century. But if Sweden's modern A. shows a relationship with the past, both it and the Dutch have common characteristics which dominate the new A. wherever it is found in Europe—a sentiment for clean, unbroken lines and broad surfaces and an arrangement of masses indicative of a concentration on shape or silhouette to the exclusion of mere façade adornment; and in England, too, in recent years architects have begun to concentrate on these characteristics. The Einstein Tower, by Mendelssohn, is a building of altogether original shape, its external form, as the architect himself said, being 'conceived merely as flesh and skin in relation to the structure of the skeleton,' and the shape conforms to the scientific purposes of the building. Sir Giles Gilbert Scott's Liverpool Cathedral is the outstanding achievement of our time in England, although it has its inspiration in the past, being essentially Classical in spirit—Gothic not only in its forms, but in its construction. But though Classical in the unity of the whole design, it is by no means Gothic in its symmetry of plan, having a nave and chancel of equal length on each side of the preaching space, while the whole yields to the impression of a single mass. As regards commercial buildings, Eng. A. is conservative. Reinforced concrete is used a great deal, but mostly it is laid in blocks like masonry, with scarcely any attempt at novelty in design. But the chief preoccupation is with the design of steel-framed buildings, though in this respect England is far behind America, and in general form most of the large new urban buildings show no radical departure from traditional Renaissance lines—limitations imposed really by building regulations on altitudes and frontages. Some of the earlier twentieth-century commercial buildings, such as Harrod's Stores, sacrifice all to window space, so that the building appears to have no visible means of support; but later examples, like the Selfridge building in Oxford Street, compromise between large windows and some measure of solid support in the ground story. Other examples of earlier twentieth-century buildings give the impression of being erected on piles, while their general equipoise is upset by the absence of a solid plinth. New methods of building must, somehow,

be reconciled with a coherent architectural design, and already there are many experiments in this direction, e.g. Adelaide House, a large modern office block standing close to London Bridge. This building, designed by Sir John Burnet and completed in 1925, is remarkable for its inwards-sloping walls, and it partly solves the window problem by making the windows an integral part of the texture of the wall. Bush House, in the Strand, affords an example in London of a modern American building, but makes more concessions

windows regularly spaced and set one above the other; in the informal type, however, symmetry and tradition are more or less disregarded, the windows and gables being set in any position that best conforms with the general plan.

The most notable figure in English architecture of the latter half of last century was Richard Norman Shaw (q.v.), who more than any of his contemporaries developed the 'free Gothic' and 'free Tudor' styles in house-planning and the brick manner known as 'Queen Anne.' He established his reputation largely by his great country houses



*Bedford & Lemere*

THE NEW ADELPHI TERRACE, LONDON  
Officially opened in 1938. Architect, Stanley Hamp.

to tradition than does Adelaide House, its window plan being less like the diagram of a chess board. It is noteworthy for giving London the first illustration of the terraced effect obtained in America by the system of setting back the upper stories. The best example in England of the modern cubist tendency in American architecture is the large building which was completed in 1926 on the site of Devonshire House in Piccadilly; and the grouping of flat-roofed blocks, combined with the sheer height of the walls, lends the building dignity in spite of the over-decorated facade.

Economy, since the First World War, has to some extent restricted the evolution of the modern dwelling-house in England. Often modern houses appear inadequate and inhospitable as compared with, e.g., any old Georgian house; though, as regards the interior, architectural planning has reached a high state of efficiency. As to the exterior design, modern houses of the more formal type are symmetrical, with their

(e.g. Craggside, Dawpool, Cheshire, and Chesters, Northumberland). As in other arts, a dynamic replaced static coherence, as exemplified in timbered upper stories and contrasting textures of rough-cast, stone, and brick aiming at the picturesque and ignoring the demands of any conventional 'style.' If Shaw can be said to have founded a school, there were continental architects who were tending in the same direction, as e.g. the Dutch architect, Cuypers, and the German, Behrens; all these, however, were deriving from the Gothic revival in England through Ruskin and Pugin. Lutyens's New Delhi and Sir Giles Gilbert Scott's Liverpool Cathedral are based essentially on Shaw's principles. C. F. A. Voysey, too, derives from Shaw, but while the latter's houses are large, florid, and elaborate, Voysey's are more restrained, but show less mastery of form. His simple mouldings and well-arranged interiors influenced domestic architecture, one good illustration being that afforded by Charles Rennie Mackintosh's Glasgow Art School.

The work of Behrens, architectural adviser to Germany's one-time prin. electrical manufacturing company, is the most significant in the early years of the present century; for like that of Adolph Loos and Otto Wagner, Viennese architects, it tended to evolve the appropriate relationship of buildings and machines or of A. and engineering. Before the First World War Behrens designed many buildings to enclose machinery, and it was but natural that such buildings should have, in some sense, a machine-like character, for both standardisation and pre-fabrication claimed his attention before 1914; but 'functionalism' or the union of A. and the mechanical never characterised his designs. The merging of these apparent incompatibles is mainly associated with Le Corbusier and Walter Gropius. The famous factory at Alfeld designed in 1911 by Gropius is claimed to be the 'first purely functional modern building,' though the merger of the concepts of machine and A. has later been carried to even greater extremes in America. Gropius stands for the final phase in that important aspect of the growth of modern A., the dissolution of the wall (John Summerson). At the Bauhaus of Dessau (1925) vast sheets of window constructed independently of the floors took the place of solid walling. The weight of the structure was concentrated at points, not distributed along continuous foundations. Thus was a final blow dealt to pyramidal emphasis, and the dynamic principle triumphed over static symmetry. In the early years following the First World War there was apparently great diversity of outlook, and in most countries A. was apparently following out its own idiom. But later there emerged from these diverse and conflicting attitudes one which both in Europe and America is gaining some degree of universality; and the work of such Eng. architects as Maxwell Fry, Wells Coats, and others, if highly modern, reveals the merit of genuine objectivity.

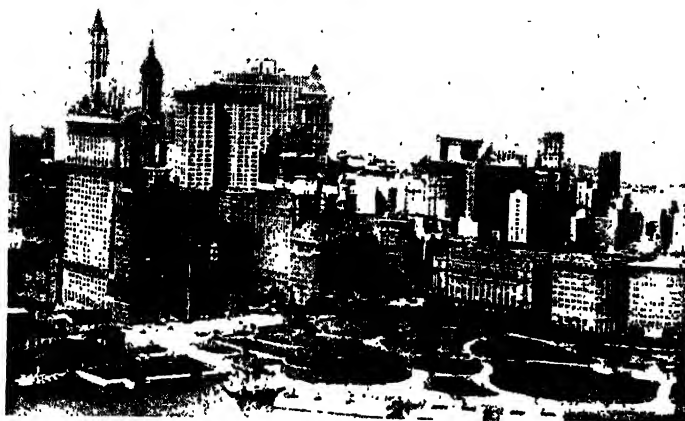
*Modern Amer. A.*—The one great development in A. contributed by the U.S.A. is the skyscraper, many of which buildings, with their soaring ornamental towers, are objects of real beauty, presenting as they do the appearance of gigantic sculptures. The principle which has given the real impetus to the best modern Amer. A. is that which has governed all great periods of architectural development, namely that of appropriateness to function and adaptability to necessity. Striking examples of this principle are the Barclay-Vesey, or the Telephone Building of New York; the State Capitol of Nebraska, in Lincoln; and the Pacific Telegraph Building, San Francisco. In all of these buildings the plan has been ruled by characteristic Amer. requirements. The Telephone Building, in particular, is an object-lesson in the success with which a commercial building has been designed so as to comprise within one harmonious whole all the different debts of a great telephone system. Obviously this type

of building can have no classical or mediæval precedent and in its design must frankly abandon the archaeological element. It is claimed for the city hall of Los Angeles (Austin, Parkinson, & Martin) that it is a successful achievement in the combination of vast administrative accommodation with freedom of classic treatment in detail. In this building the municipal offices are planned in a lofty central tower which shoots up from a large rectangular base, the principle of Classic detail being modified by touches of Romanesque sentiment. It is significant, however, that the Classic element is in detail only. Yet the Amer. attitude towards A., contrary to current Brit. views on America, is essentially conservative, an attitude primarily explained by her Classic training; a training exemplified by the influence of Robert Adam, the Romanesque revival of Thomas Jefferson, the influence of the World's Columbian Exposition at Chicago, 1893, and the academic brilliance of McKinn, Mead, & White. The church of St. Thomas, Fifth Avenue, the Savoy Plaza Hotel, and the Bowery Bank, New York, are examples showing that Gothic, Classic and Romanesque respectively can be incorporated into modern A. with progressive freedom. The ornate mass of the offices of the New York Life Insurance Company (Cass Gilbert), on the site of Madison Square Garden, is Gothic; the lofty Woolworth Building, in New York, is generally styled Gothic, too, yet in these cases the Gothic element is somewhat slight and subordinate to the utilitarian application of archaeological features. There is genuine beauty in such Classic buildings as the Cunard Building, New York, the Stevens Hotel, San Francisco, and the Pacific Oil and Electric Company's building, also in San Francisco; but it is obvious in America that the Classic style of McKinn, Mead, & White is disappearing; the Romanesque influence of H. H. Richardson is also doomed; and even Stanford White is a past name. The old forms are yielding to a school of A. in which form is increasingly functional and national, and decoration governed by the form it decorates, e.g. in the Chanin Building (Sloan & Robertson), a 'set-back' skyscraper building, near the bottom of the rectangular base of which is a frieze of enormous foliage treated conventionally, though somewhat out of scale with the brick piers above and the more successful ornamental bronze band below. Suitability to environment is the keynote to progressive development in the U.S.A. Compromise between plan and function is un-Amer.; such conflict exemplified in buildings with hanging columns, or buildings like the Union Station at Cleveland. Among some of the most typical Amer. skyscrapers which illustrate the rapid development of Amer. A., combining all sections or depths of vast undertakings in a well co-ordinated unity, are the Park Avenue Building, New

York, and the Hollywood Storage Company's warehouse. In these the old style of piling up the orders has completely disappeared; the later style in which upper and lower floors are contained in an order bearing no relation to the floors behind the façade is also absent; the most modern design being to adopt the windows and walls themselves as the unit of scale applied to the whole building, a logical treatment which is a great improvement in style. The 'step back' style is the necessary result of the zoning laws, and has done much to improve design and

stations of the Pennsylvania and the New York Central railroads in New York City.

**Bibliography.** GENERAL: Gwilt's *Encyclopædia of Architecture*, 1903; Russell and Sturgis's *Dictionary of Architecture*, 2 vols., New York, 1901-2; Le Corbusier, *Vers une architecture*, 1929; T. D. Atkinson, *Glossary of Architecture*, 1928; P. Nobbs, *Design*, 1937; A. E. Richardson and Hector O. Corbato, *The Art of Architecture*, 1938; Bruno Taut, *Modern Architecture*, London, 1929; H. Robertson, *Modern Architectural Design*, 1932; P. A. Abercrombie (ed.), *The Book of the Modern House*, 1939; Sigfried Giedion,



NEW YORK SKYSCRAPERS

lend perspective in congested areas. Some of the best recent types are the Barclay-Vesey Building, New York; the Radiator Building, New York; the Fisher Building (Albert Kahn), in Detroit, an enormous yet rhythmically planned and finely massed edifice, full of colour and wealth of material; the City Hall (Austin, Parkinson, & Martin), Los Angeles; the Graybar Building, New York; the Park Avenue Building, New York; the Skelton Hotel; the Chanin Building, New York; No. 333, Michigan Avenue, Chicago; and the Pacific Telephone Company's Building, San Francisco. Of great significance to modern A. in America, too, are the massive cathedrals in Washington and New York, which are being slowly completed, probably the 2 finest modern examples of their kind. The Princeton Univ. Chapel (Cram & Ferguson, who are the architects of the Cathedral of St. John the Divine, New York), completed in 1928, is claimed to be the most scholarly and carefully evolved modern Gothic building in America. Other notable architectural achievements in the U.S.A. are the 2 great cathedral-like railway

*Space, Time, and Architecture* (Harvard Univ. Press and Oxford Univ. Press), 1941; Maxwell Fry, *Fine Building*, 1942. HISTORY: James Fergusson, *History of Architecture in all Countries to the Present Day*, 1893-5 (5 vols.); F. M. Simpson, *A History of Architectural Development*, 1905-11 (3 vols.); Cholsy's *Histoire de l'Architecture*, Paris, 1899; the Fr. series of which the general title is *Bibliothèque de l'Enseignement des Beaux Arts*, Paris, 1887-92, by Laloux, Corroyer, and Palustro; the Ger. series entitled *Handbuch der Architektur*, ed. Durm, Darmstadt, 1895; H. H. Statham, *A Short Critical History of Architecture*, 1927; Kenneth Clark, *The Gothic Revival: an Essay in the History of Taste*, 1928; Banister Fletcher, *A History of Architecture on the Comparative Method*, 1933; Talbot F. Hamlin, *Architecture through the Ages*, 1941. ANCIENT AND CLASSICAL: Anderson, Spiers, and Dinsmoor, *The Architecture of Ancient Greece, and The Architecture of Ancient Rome*, 1926; E. A. Gardner, *Art of Greece*, 1925; D. S. Robertson, *A Handbook of Greek and Roman Architecture*, 1929. MEDÆVAL: Francis Bond, *Introduction to English*

*Church Architecture*, 1913 (2 vols.); T. G. Jackson, *Byzantine and Romanesque Architecture*, 1920 (2 vols.); Strzykowski (trans. by Dalton and Braunholtz), *Origin of Christian Church Art*, 1923; G. Baldwin Brown, *The Arts in Early England*, vol. II., *Anglo-Saxon Architecture*, 1925; O. M. Dalton, *East Christian Art*, 1925; A. W. Clapham, *English Romanesque Architecture before the Conquest*, 1930; J. A. Hamilton, *Byzantine Architecture and Decoration*, 1933; H. Braun, *The English Castle*, 1936; S. Toy, *Castles*, 1939; F. H. Crossley, *The English Abbey*, 1940. RENAISSANCE: Reginald Blomfield, *A Short History of Renaissance Architecture in England*, 1897; T. G. Jackson, *The Renaissance of Roman Architecture*, 1921-23 (3 vols.); L. Milman, *Sir Christopher Wren*, 1908; W. H. Ward, *The Architecture of the Renaissance in France*, 1926 (2 vols.); W. J. Anderson and A. Stratton, *The Architecture of the Renaissance in Italy*, 1927; G. Webb, *Wren*, 1937; L. Whistler, *Sir John Vanbrugh*, 1938. See also under HOUSE.

**Architecture, Free School of**, an institute at Paris which provides gratuitous training in the principles and practice of A. Foreigners are admitted on the same footing as Frenchmen, but owing to the large number who have applied, the number of them is now allowed to form only a certain percentage of the list. Admission is by examination, the standard of which has been greatly raised of late, owing to the great increase in the number of applicants.

**Architrave**, an architectural term applied to the lowest part of the entablature (q.v.) which rests directly upon the columns. Also applied to the beam over a window or door or other square opening.

**Archives** is the name given to collections of important documents. It is now as a rule only used to denote gov. records, i.e. state A. For further details see RECORDS.

**Archivolt**, in architecture, the band of masonry framing a curved opening.

**Archon**, the highest magistrate in the Athenian and the other Gk. democracies. According to tradition, the last king of Athens, Codrus, was succeeded by his son Medon as A. instead of king. The historical development of the office can probably be traced to the reduction of the power of the original basileus (king), who was left with religious functions only by the military and civil powers being handed over to other officials. At Athens there were 9 As.; the chief, or A. eponymous, who gave his name to the year and dealt with domestic cases; the basileus, with religious powers; the polemarch, who had jurisdiction in military and foreign matters, and 6 thesmothetes, or criminal judges. The office, originally of life tenure, became ann. and open to all citizens.

**Archpriest**, an eccles.; term dating from the fourth century, and originally applied to a senior priest attached

to a cathedral as assistant to the bishop and overseer of the subordinate clergy. The modern representative of the office is a dean. The term had a special application in the early seventeenth century to the superiors appointed by the pope to govern secular priests sent into England. These had been left without a head at the death of Cardinal Allen in 1594. The archpriest had 12 assistants, but was subordinate to the superior of the Jesuits in England. The office, which was much opposed, lapsed in 1621.

**Arch Stone**, a wedge-shaped stone used in the construction of arches. The A. S. of a common bridge has 2 flat faces, inclined to the breadth of the curve, but in the skewed bridge these corresponding surfaces are twisted. Technically called *voussoirs* (see under ARCH).

**Archytas**, Gk. Pythagorean philosopher; fl. c. 400 B.C. Regarded as founder of scientific mechanics. Said to have invented the pulley and 'doubled the cube.'

**Arcis-sur-Aube**, tn. in Aube, France, on R. Aube, 16 m. N.E. of Troyes. The site of an engagement between Napoleon and the Allies under Schwartzburg, March 20-21, 1814, in which Napoleon was forced to retreat. Pop. 2,400.

**Arc Lamp**, an electric lamp in which light is produced by the flow of current between carbon or other electrodes separated by a few millimetres' distance, across which an A. burns with the emission of an intense white or bluish light. A direct-current arc burning in air forms, and a crater is burnt on the tip of the anode, or positive electrode, from which volatilised carbon is projected across the A. path on to the cathode or negative electrode. The crater surface of volatilised carbon has a temperature of over 3000° C., and emits about 170 candle-power to the sq. mm. of surface, normal to the surface, but the arc flame itself emits but little light of a violet colour. A similar A. is also used for the electric furnace and electric welding.

**Arcograph**, see CYCLOGRAPH.

**Arcola**, tn. of Verona, Italy, 15 m. S.E. of Verona, on R. Alpone, trib. of Adige. Pop. 4,500. The scene of Napoleon's victory over the Austrians under Alvinczi, Nov. 15-17, 1796. This forced the Austrians to abandon the relief of Mantua.

**Arcon**, Jean Claude de (1733-1800), Fr. military engineer, b. at Pontarlier. Became famous in Seven Years war at defence of Cassel. Invented floating batteries used in siege of Gibraltar. Member of Senate, 1799.

**Arcos**, Don Rodrigue Ponce de Leon, Duke of vicery of Naples for Spain, 1646-48, whose taxation caused the insurrection of the people of Naples under Aniello Tommaso, or Masaniello as he was called. After 1648 the duke of A. retired from political life.

**Arcot**: 1. Name of 2 contiguous

dist. and a city of Madras, India. N. A. is bounded on the N. by Cuddapah and Nellore, on the E. by Chingleput, on the S. by S. A. and Salem, and on the W. by Mysore. Area 7386 sq. m. S. A. is bounded on the N. by N. A. and Chingleput, on the E. by the Fr. colony of Pondicherry and the bay of Bengal, on the S. by Tanjore and Trichinopoly, and on the W. by Salem. Area 5217 sq. m. Both dists. are flat on the coast; hilly, with jungles, inland. Ceded to E. India Company, 1801. 2. Chief city of N. A., on R. Palar, 65 m. S.W. of Madras. Taken by Clive, 1751; lost to the Fr., but recaptured in 1760. Taken by Hyder Ali, 1780. Passed finally to Brit., 1801. The tn. preserves only a few mosques and tombs as relics of its former grandeur. Above the ruins of the Delhi Gate is Clive's Room. Pop. of N. A., 2,055,594; S., 2,320,085.

**Arctic Animals** do not present great variety in species, except in the case of the lowest forms of life, e.g. the deep-sea fishes, which are unaffected by changes in lat. Molluscs, annelids, and jelly-fish are common to all the N. seas, while such fish as the salmon, cod, and halibut are plentiful, and provide employment for European sailors. Insects are found far N., such as bees, flies, moths, and butterflies, but as the flora is scanty, they do not occur in great abundance. The birds are chiefly sea birds, as petrels, eider ducks, cormorants, auks, gulls, puffins, and gull-mots, and all are migratory. The mammals include the walrus, seals, and several varieties of whale—the white whale and narwhal, grampus, and bottle-nosed whale, but the whalebone whale (*Balaena mystecetis*) is becoming rare; the polar bear, reindeer, elk, fox, wolf, ermine, and musk-ox are the prin. terrestrial mammals. Insectivorous and herbivorous habits are naturally almost absent in A. A., which are piscivorous or carnivorous as they dwell chiefly in the sea or on land. Many of them exhibit the curious phenomenon of becoming snowy-white in winter, and among these are birds, as the ptarmigan, and mammals, as the hares and lemmings, which are brown in summer, and the A. fox, which is slaty-blue in summer; the polar bear is, of course, white all the year round. See *Manual of Natural History of Greenland*, by T. Jones, pub. by the Admiralty, 1875; A. Hellprin, *Geographical and Geological Distribution of Animals*, 1887; S. P. Gordon, *Amid Snowy Wastes: Wild Life*, 1922; V. Stefánsson, *Hunters of the Great North*, 1923.

**Arctic Circle**, The, is an imaginary circle drawn round the N. Pole at a distance of 23½ degrees therefrom, this angle being equal to the angle between the plane of the equator and the plane of the ecliptic. The corresponding circle in the S. hemisphere is called the Antarctic Circle. Within these limits the sun disappears entirely from view for a certain period in the year, and for another period is always visible. The

length of these periods varies with the nearness to the Pole, the nearer the Pole the longer the period during which the sun is continually above the horizon.

**Arctic Exploration.** The first A. voyagers were the old Viking ancestry of the Norwegians, and if they have left no enduring marks to posterity, at least they discovered Iceland and Greenland and colonised them. After the time of Harald Hardraade, the Northmen gave up adventure in the N. seas, and it was only in the fifteenth century, when the Eng. and Dutch led the van of seafaring nations, that A. E. was revived. There was, however, this clear difference between the objective during these earlier times and the modern quest, that whereas Eng. and Dutch explorers were constantly searching for a suppositious N.E. or N.W. passage to China or India, virtually the sole aim of the latter-day explorer has been the almost purely sentimental one of reaching the N. Pole. The first of the navigators, stimulated by the success of Columbus in the field of exploration to renewed efforts to discover a W. route to Cathay, was Sebastian Cabot, who in 1496 sailed from England towards the N.W. Little is known of Cabot's voyage, though it seems, according to a contemporary account, that he must, before turning eastward in despair, have sailed into the gulf of St. Lawrence and partly through the straits of Belle Isle from the N. opening, of which the coast of Labrador sweeps to the W., and so on to Shekateka Bay, where that coast trends eastward (51° N.). In 1553 the Muscovy Company of London Merchants, formed to promote commerce with Russia and the E., prepared an expedition 'for the discovery of Cathay, and divers other regions, dominions, islands, and places unknown,' by the exploration of the seas eastward of the N. Cape. The expedition, consisting of 3 ships, set out from Ratcliffe under the command of Sir Hugh Willoughby. The record of Willoughby's wanderings, probably along the coast of Novaya Zemlya, was learnt from the explorer's own journal when, the following year (1554), some Russian fishermen found him and his crew, frozen to death, at the mouth of the R. Arzina, in Lapland. Richard Chancellor, who commanded the larger of the other 2 ships, reaching Wardhus (Vardöhus) on Vardö Is. in safety. The narrative of Chancellor's expedition, which was written by Clement Adams and preserved by Hakluyt, shows that Chancellor entered the White Sea, till then unknown to the civilised world, and explored the country round Archangel. After this follow the 3 voyages of Martin Frobisher in quest of a N.W. passage to Asia. None of these or any of the attempts made at this time resulted in the wished-for discovery, though some of them were not unproductive of results to geographical science. In his first voyage Frobisher found a bay

which has since been named after him, in 61° N., and landed on an is. since called Gabriel Is., where his party for the first time in the hist. of Englishmen encountered the Eskimos. In 1577 Frobisher made his second journey. He anchored in what was named by him Jackman's Bay, believing, indeed, that he had solved the problem of a N.W. passage to Asia, and landing on what is now known as Fox Land, formally took possession in the name of the queen. Marching into the interior, his party discovered nothing at first but mosses, lichens, and a few juniper bushes and stunted firs. The third expedition sailed from the Thames in May 1578. The only result of the voyage was the finding of what was supposed to be gold, but which in all probability was merely ferruginous or cupreous pyrites, upon an is. in Bear Sound, which they named Countess of Sussex Is. In 1585 John Davis renewed the attempt to discover a N.W. passage to the E., publishing in 1593 a short narrative of his 3 voyages (1585-1587) entitled *The World's Hydrographical Description*. The net results of Davis's first voyages were a better understanding with the natives of Greenland—the W. coast of which he explored up to 61° N., naming it Desolation—and the discovery that land still hemmed him in as far as 67° N. In his last voyage he sailed through Davis Strait and the bay which was not navigated till close upon 30 years later by Baffin and since called Baffin Bay, as far N. as Melville Bay. Thus he was on the direct route to the Pole, but his quest being a short passage to the Pacific, he deviated and sailed westward. Ten years later Barents, the Dutch navigator, made his celebrated voyage in search of a N.E. route to China, and the narrative of his perils and death forms one of the most interesting and pathetic records of human bravery and endurance. The scene of his wintry sojourning was not revisited for nearly 300 years, when Capt. Carlsen, in 1871, landed there and found the wooden house, the ashes still upon the hearth, as the explorers had left it, together with an old clock, Barents's flute, and other interesting relics of the ill-fated expedition, all of which are now in the possession of the Dutch Gov. With Barents seems to end the quest for a short route to the E., or rather that quest is lost sight of in the general exploration of the A. Hudson's first voyage took place in 1607, and resulted in the discovery of the most northerly point of the E. coast of Greenland (73° N.), called Hold with Hope. He penetrated as far N. as 80° 23', and on returning discovered Jan Mayen Is. In 1610 he discovered Hudson Strait and the large bay which has left his name to posterity. His voyages opened the way to the Spitzbergen whale fisheries, 1612-13 Sir Thos. Button, supported by the Merchant Adventurers of London,

entered Hudson Bay, and crossing over westward, explored Southampton Is. up to 65° N. Baffin as pilot and navigator in the *Discovery* investigated the coasts of Hudson Strait in 1615, and later, with the same ship, circumnavigated the great sound with its numerous trib. channels, which has since received the name of Baffin Bay. There was but little in the way of fresh discovery in the years immediately following the efforts of the sixteenth- and seventeenth-century explorers, though much was done to reap the benefits of their discoveries. After the formation of the Hudson's Bay Company, that company's servants, towards the latter part of the eighteenth century, effected some important journeys to explore the shores of the Amer. polar seas, Samuel Hearne navigating the Coppermine R. to the Polar Sea, and Alexander Mackenzie discovering the mouth of the riv. named after him. Dutch rivalry in A. E. resulted in Marten's visit in 1671 to the Spitzbergen group of is., and the best record of the natural hist. and physical features of that part prior to Scoresby's *Account of the Arctic Regions*, in the discovery by Capt. Gillies in 1707 of Gillies Land, and in the opening up of the Dutch whale fisheries of Davis Strait. In 1806 the intrepid fisher and scientific observer, Scoresby, advanced his ship, the *Resolution*, up to 81° 12' N., and 16 years later, forcing a passage through the ice barring the approach to the E. coast of Greenland, he surveyed that coast for a distance of 400 m. In the course of the eighteenth century Russian explorers penetrated to the most northerly parts of Siberia, Lt. Chelyuskin in 1735 reaching the cape in 77° 25' N. which bears his name; while Bering, a Dane, put by Peter the Great in command of the *St. Paul*, set out from Okhotsk to explore the Amer. side of the strait which he had discovered 12 years previously, and which is named after him. After finding Mt. St. Elias he was wrecked and perished in the vicinity of the Aleutian Is.

A. E. appears to have been dropped in England towards the last quarter of the eighteenth century, and it was only with difficulty that the Gov. could be induced to support even voyages of scientific research in polar regions. In 1778, however, Capt. Cook was instructed to sail northward from Kamchatka and look for a N.E. or N.W. passage from the Pacific to the Atlantic. He reached Cape Prince of Wales, the W. extremity of America, and after passing through Bering Strait, found his way barred by ice. In 1815 the search for the N.W. passage was revived in England by the strenuous advocacy of Sir John Barrow, through whose influence a reward of £20,000 was offered for its accomplishment, and £5000 for reaching 89° N. (1818). The most celebrated names during this period of revival were those of Lts. Edward Parry and John Franklin,



whose chief discoveries between 1819 and 1827 were Lancaster Sound, the continuation of which was called Barrow Strait, an archipelago, now known as Parry Is., Melville Is., Fury and Hecla Strait (a channel leading W. from the head of Hudson Bay), and Prince Regent Inlet, a wide opening observed on the third voyage in 1824 to the S. from Lancaster Sound. In 1827 a new chapter opens in A. E. with Parry's attempt to reach the Pole. This attempt was remarkable for the fact that the explorer abandoned his ship and endeavoured to make his way over the northward drift-ice with boats which his party dragged along on sledges. He reached the then highest lat. (82° 45'), but, carried southward by the current, he was forced to return. Prior to Sir John Franklin's ill-starred expedition in 1845, Capt. John Ross, with the financial assistance of Sir Felix Booth, a distiller, set out in a small steamer, the *Victory*, on a private expedition of discovery. The most remarkable feature of this expedition was Ross's sledge journey, after abandoning his ship, across the ice. In the course of his voyage he discovered the gulf of Boothia (named after his patron) and King William Land, and located the position of the N. Magnetic Pole. In 1845 Franklin, with the *Erebus* and *Terror*, set out on his tragic journey through the channels of that dense ice-packed region called by Sir George Nares the Palaeocrystic Sea, to Beechey Is., along the W. shore of N. Somerset (discovered by Parry in 1819), through a southward channel called Peel Sound to King William Is., in the effort to reach some channel to Bering Strait. It appears, however, that the great ice floes from the vicinity of Melville Is. rendered all progress impossible save by rounding the E. side of King William Is.; Franklin did not know that this latter was an is., and so perished with all his party. Numerous expeditions for some years afterwards endeavoured to ascertain Franklin's fate. Sir James Ross, in 1848, was sent with 2 ships, the *Enterprise* and the *Investigator*, by way of Lancaster Sound, and with Lt. McClintock made a long sledge journey along the N. and W. coasts of N. Somerset. In 1850 elaborate and extensive plans of search were organised under Capt. Penny, Austin, Ommaney, Lts. McClintock, Collinson, and McClure. Austin and Penny went through Barrow Strait and discovered Franklin's winter quarters of 1845-46 at Beechey Is. This party wintered on the S. coast of Cornwallis Is. and arranged sledge travelling excursions for the spring, Penny undertaking the Wellington Channel route, McClintock advancing to Melville Is., while Capt. Ommaney went southward, discovering Prince of Wales Is., and Lt. Brown investigated the W. shore of Peel Sound. In 1851 Lady Franklin sent out the schooner *Prince Albert* under Capt. Kennedy and Lt. Bellot of the Fr. Navy,

the Frenchman discovering in the course of a long sledge journey Bellot Strait separating N. Somerset from Boothia, thus proving that this part of the Boothia coast was the N. extremity of the continent of America. In May 1851 Collinson, in the *Enterprise*, penetrated the narrow Prince of Wales Strait between Baring and Prince Albert Is., reaching Princess Royal Is., where McClure had been the previous year. He then wintered in Prince Albert Is. and dispatched travelling parties in the spring of 1852 to explore Prince of Wales Strait and the S. portion of Prince Albert Land. When the ship was free Collinson went E. along the coast of N. America, and after wintering a second time in Cambridge Bay, he examined the shores of Victoria Land up to 70° 26' N. and westward to 100° 45', being within a few m. of Point Victory, where, indeed, he would have learnt the fate of Franklin. This great voyage was only completed in 1854, when Collinson brought back the *Enterprise* safely to England. In the meanwhile McClure, in the *Investigator*, had passed the winter of 1850-51 30 m. from Barrow Strait at the Princess Royal Is., and actually saw a N.W. passage, which, however, he could not reach on account of a branch of the palaeocrystic ice that had baffled Franklin off King William Land. This ultimately forced him southward round Baring Is., whence he endeavoured to drive a passage to the N. between the W. shore of King William Land and the cliff-like ice walls. Eventually, after the narrowest escapes, he took refuge on the N. shore of Banks Land, and in the early part of 1853, after preparing to abandon his ship for the Amer. coast, was fortunately rescued. In 1852 the Brit. Gov. dispatched another expedition, via Lancaster Sound, under Sir Edward Belcher, Sherard, Osborn, Capt. Kellett, and McClintock. McClure's record was discovered by Lt. Meham, one of the sledge travellers of this expedition. This discovery soon led to the succour of McClure, who thus partly by ship and partly by travelling over ice, had now in fact accomplished the N.W. passage, for which long-sought prize he was knighted, and, together with his party, received a grant of £10,000. In 1854 Dr. Rae, whose previous work in A. E. was in 1846-47, when he crossed the isthmus joining Melville Peninsula with the mainland and skirted the shores of Committee Bay and the E. coast of Boothia as far as Lord Mayor's Bay, joined Sir J. Richardson in a search for Franklin. He brought home tidings of Franklin's expedition from the Eskimos, the immediate consequence of which was that McClintock, in the *Fox*, with Capt. Allen Young and Lt. Hobson, prosecuted a thorough search of the W. coast of Boothia, the whole shore of King William Is., and Montreal Is. Eventually this party came upon a paper outlining the voyage of Franklin and telling of his death in June 1847 and the departure of the

survivors in an attempt to make the Great Fish R., in which attempt none ever succeeded, though sev. traces of their straggles were subsequently found. McClintock's voyage proved that Franklin's expedition did in fact discover a sea route from the Atlantic to the channels S. of Victoria and Wollaston Land to Bering Strait, and since that time Capt. Hall and Lt. Schwatka, of the U.S. Navy and Army respectively, have discovered other relics of Franklin's expedition. A notable expedition in quest of Franklin was that of Dr. Elisha Kent Kane of the U.S. Navy, who, sent out by the U.S. Gov. in 1852, to look for the Eng. explorer, made his winter quarters in Van Rensselaer Harbour, and with his boat, the *Advance*, pushed on to Smith Sound, where his further progress was stopped by ice at the entrance. Kane's contributions to A. E. contain a great deal of valuable information as to fauna, flora, magnetic conditions, and climate; the first really authentic and detailed account of the Etah Eskimos; and, by his sledge journey to Cape Constellation, the making known to the world of the marvellous waterways along the W. of Greenland between Smith Sound and the A. Ocean, which afford the acknowledged easiest route to the Pole.

In 1871 Charles Hall, of Cincinnati, took the *Polaris* for 250 m. up the channel which runs N. from Smith Sound. He is credited with having reached an unprecedented lat. by ship, and exploring Grant Land to within 412 m. of the Pole. In 1875-76 Sir George Nares, with Lts. Aldrich, Markham, and Beaumont, touched 83° 20' N., after pushing along Grant Land to 85° W. long. and Greenland to Cape Britannia. In 1883 Lt. Greely, of the U.S. Army, made extremely valuable observations round Lady Franklin Bay (81° 44') on the fauna and flora, climate, tides, and magnetism of this region. During the sojourn of the Greely expedition (1881-84), Lt. Lockwood, by touching 83° 24', gained for the U.S.A. the honour of reaching the then farthest N. The next most important work of this period was the traversing of the great glacier forming the interior of Greenland by Nansen and Peary. Nansen's theory was that a current flowed at some point between the Pole and Franz Joseph Land from the Siberian A. Sea to the E. coast of Greenland; but his objective was never so much to reach the Pole, a matter of possibly secondary importance, as to investigate the great unknown region that surrounded the Pole, and in 1893, in the *Fram*, a ship specially designed to sustain and rise to powerful ice-pressure, he set out on his brilliant expedition to cross the polar ocean by relying on the drift from E. to W. after deliberately forcing the ship into the ice. The *Fram* ultimately emerged from the pack to the N. of Spitzbergen. Dr. Nansen's chief discovery being to

ascertain the existence of a very deep ocean to the N. of the Franz Josef group, which was found to be a continuation of the water to the N. of Spitzbergen. In Apr. of 1895 Nansen with a single companion, Johansen, left his ship, and by means of kayaks and sledges drawn by dogs, reached farthest N. (86° 13'). Dr. Nansen's theories are on the whole sound, and the light he threw on what has been called the polar question estab. his fame for all time. Mr. Peary in 1892 and 1895 made journeys over the inland ice of Greenland, but beyond ascertaining the N. limit of the ice-cap of the Greenland glacier, added little to general information. Then in 1897 the Jackson-Harmsworth expedition in the *Windward* explored Waigatz Is. and the W. part of Franz Joseph Land, discovered a wide channel opening on a northward sea, and made important magnetic and meteorological observations. In 1897 Andr e, with Fraenkel and Strindberg, set out on their unhappy balloon journey. Except for buoys cast overboard, nothing further was heard of this expedition until 1930, when their bodies were found in White Is., near Spitzbergen. The latest of 3 buoys found showed that the balloon reached 82° N. 25° E., but no other traces were discovered until 1930. Then Andr e's diary showed that at 1 time the balloon reached a point a little higher than 83° N. In 1899 Sverdrup, Peary's companion in 1892, led a party in the *Fram* up Smith Sound to explore the N. coast of Greenland, while in the same year Lt. Peary, with the help of Eskimos, followed the same route, and the duke of Abruzzi on the Norwegian whaler *Jason* proceeded to Franz Josef Land. In 1900 various sledge parties were sent N., one, under Captain Cagni, reaching a point 20 m. beyond Nansen's farthest N. The names of prin. note in the twentieth century, notable for Peary's achievement in reaching the Pole, are those of Peary himself, Amundsen, Ejn r Mikkelsen, and Mylius-Erichsen. Peary undertook his last voyage in 1908, shortly before the time that Dr. Frederick A. Cook claimed to have reached the Pole. With a few whites, nearly 50 Eskimos, and 200 dogs, he crossed the frozen seas, passing his own previous record of 87° 6' N. In 1908, and ultimately, on Apr. 6, 1909, gained for the U.S.A. the honour of first reaching the Pole. The rapidity of Peary's travelling may be gauged from the fact that he traversed nearly 150 m. in 5 days going N., and on his return journey over 400 m. in 16 days. He located the Pole on a deep ice-covered ocean, there being no land in its vicinity, his soundings being 1500 fathoms within 5 m. of the Pole. The chief work of Mylius-Erichsen was the completion of the exploration of the hitherto unknown parts of the coast of Greenland, from Cape Farewell, 60° N., for over 1600 m. to 83° N. He d. of cold and starvation after crossing the

inland ice between Denmark Flord and Lambert Land in an effort to identify Peary's Navy Cliff. Mikkelsen, another Dane, recovered Erichsen's records for Denmark in 1912, and it is worthy of note that these records alter the entire cartography of N.E. Greenland; they prove that Peary Channel is no more than a fiord, Hazen or Peary Land merely a N. extension of Greenland and not separate, and that Greenland extends over 20° eastward of Peary's farthest E., the net result being the addition of over 150,000 sq. m. to Greenland, and the discovery that N.E. Foreland (12° W. 83° N.), the E. extremity of Greenland, is within 23° of Spitsbergen. Other explorations of note are those of O. Sverdrup in Grinnell Land and his discovery of Helberg and Rengues Is., the re-location in 1904-5 by the Norwegian Amundsen of the N. Magnetic Pole in 70° N. 97° W., and the investigations of the Eskimos of V. Stefansson from 1908 to 1912. The great feat of Amundsen was the unquestioned accomplishment of the N.W. passage over Franklin's route.

A 'N.E. passage' was only discovered in the late years of the nineteenth century, and even to-day the waters eastward are but cursorily known. Since Nordenskjöld's journey in the *Vega* (1879), Wilkitsky's expedition in 2 ice-breakers in 1915 and Amundsen in the *Maud* in 1919-20 made the journey. Wilkitsky's boats brought back much valuable information on the Arctic coast of Siberia, and since then the Soviet Republic has sent out survey boats to the same region. Thus practical work remained the keynote of exploration as before 1913, it being realised that the objective in the A. should be not so much the discovery of open seas near the Pole, but of land in N. lats. which might be feasible as a base for explorers to the polar seas. Not that efforts do not continue to be made to cross the Pole, for Amundsen's *Maud* tried to follow Nansen's former route, in the hope of drifting to the Pole; but the effort was not successful, though the expedition which, later, was made under Wisting returned with much useful information about the Siberian coast supplementary to that of Wilkitsky. Peary remains the only explorer who has sailed to the Pole, but his reported finding of Croker Land in 85° N. lat. was not confirmed by Amundsen in his polar flight in 1926, nor by the Amer. explorer, D. B. MacMillan, who explored Ellesmere and other Is. during the period 1913-17. One good result of Peary's exploit has been to reconcile explorers to research rather than to more or less useless spectacular discoveries. The Norwegian, K. Rasmussen, throughout the decade 1920-30 has opened up a mine of knowledge on Greenland and the Eskimos, as also have E. Mikkelsen and J. P. and L. Koch (1921-23).

The aeroplane has not been an unqualified success for exploration work.

Amundsen, however, though he failed to reach the Pole in 1926, showed that with sufficient petrol the feat could be accomplished, and in the following year Commander R. Byrd flew to the Pole from Spitsbergen and back, and Amundsen's dirigible *Norge* also crossed from the same base to Alaska. Amundsen was accompanied by Gen. Nobile, the It. designer of the airship, but unfortunately the enthusiasm of Amundsen's adventurous spirit caused him to quarrel with Nobile over the allocation of the credit for the flight as between Italy and Norway, and the 2 parted. Later, however, when it was learned that Nobile was missing on his second flight, Amundsen generously joined in the flights organised for relief. Nobile was eventually rescued, but nothing further was ever heard of Amundsen.

In 1928 Capt. Sir Hubert Wilkins flew from Alaska to Dead Man's Is., Spitsbergen. The flight lasted less than a day, but though no new land was discovered in the waters N. of Canada, useful observations were made on meteorological and navigation conditions in that region. Later in the year Gen. Nobile made 3 flights in his dirigible *Italia*, and on the third reached the Pole, only to be wrecked off N.E. Land. Numerous expeditions were organised for relief by many nations, but the Soviet Icebreaker *Krassin* was the first to reach the stranded party. Meanwhile Nobile had been taken off the ice by a Swedish aviator. Half the crew, however, perished, no trace of them or of the wrecked airship in which they had been carried away being found. With Amundsen, who, as stated above, joined in the relief expeditions, were 5 other men, who also disappeared.

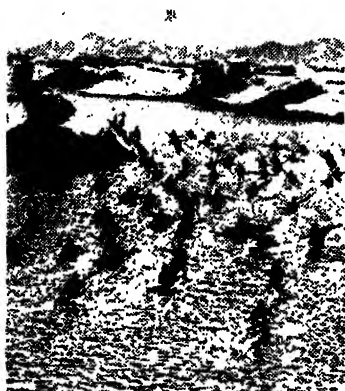
In 1931 Gino Watkins (Cambridge Univ.) tried to organise an air route from the United Kingdom to Canada via Greenland, but lost his life while hunting in a kayak in Greenland (see F. Spencer Chapman, *Watkins's Last Expedition*, 1934). In 1931-32 Prof. Ushakov, of the Soviet Union, explored Northland (formerly Nicholas Is.), a little-known Is. N. of Cape Chelyuskin. In Sept. 1936, the Fr. polar research ship, *Pourquoi Pas*, foundered off Iceland with the loss of all but 1 of its crew, and of the famous Fr. explorer, Jean-Baptiste Charcot (q.v.). In the same year a Soviet hydrographic expedition, on the icebreaker *Sedov*, claimed to have mastered the new sea route in the region of Nordenskiöld Archipelago, investigated for the first time 40 years ago by the Russian explorer, E. Toll. In 1937, the Soviet Gov. estab. a Russian polar station in the vicinity of the N. Pole, and there were reports in that year that the Soviet had annexed the N. Pole itself. Prof. Otto Schmidt, who headed a Soviet expedition in 1937-38, reported that the N. polar summer climate was considerably milder than was expected and even showed temps. above freezing point; and soundings in the Polar Sea had proved that it was more than 3000

ft. deeper than Nansen's researches had led them to expect. See Sir John Ross, *A Voyage of Discovery, for exploring Baffin's Bay and a North-west Passage*, 1819; Sir E. Parry, *Journal of a Voyage for the Discovery of the North-west Passage*, 1819-1820 (and subsequent Journals, 1824-28); Sir John Franklin, *Narrative of Journey to the Shores of the Polar Sea*, 1819-22, 1823; Sir J. Barrow, *Voyages of Discovery and Research within the Arctic Regions*, 1846; J. Payer, *New Lands within the Arctic Circle*, 1876; A. H. Markham, *The Great Frozen Sea*, 1878; Duke of the Abruzzi, *On the Polar Star*, 1903; R. Amundsen, *The North-west Passage*, 1909, and *The First Flight Across the Arctic Ocean*, 1927; R. F. Peary, *The North Pole*, 1910; F. Nansen, *Hunting and Adventure in the Arctic*, 1925; K. Rasmussen, *Across Arctic America*, 1927; R. N. Rudmore Brown, *The Polar Regions*, 1927; R. E. Byrd, *Skyward*, 1928; L. Brontman, *On the Top of the World: the Soviet Expedition to the North Pole*, 1937; H. P. Smolka, *40,000 against the Arctic*, 1937; F. Spencer Chapman, *Watkins's Last Expedition*, 1938; R. J. Cyrtax, *Sir John Franklin's Last Arctic Expedition*, 1939; V. Stefánsson, *Ultima Thule: Further Mysteries of the Arctic*, 1942; J. K. Cross, *The White Magic*, 1948.

Arctic Ocean is usually defined as the area of water within the A. circle. It lies to the N. of Europe, Asia, and N. America, and communicates with the Atlantic by means of the wide sea between Norway and Greenland; Denmark Strait, between Greenland and Iceland; and Davis Strait, between Greenland and Brit. N. America. The only communication which it has with the Pacific is by means of Bering Strait. —A relatively mild climate is found a long way inside the A. circle owing to the influence of the Gulf Stream off the coast of Norway, and, on the other hand, A. conditions are caused to exist far into the Atlantic by means of the A. currents, which flow through Davis Strait and along the E. coast of Greenland. The sea between Norway and Greenland belongs physiographically to the same basin as the A. O., as ridges between Greenland, Iceland, Farøe Is., and the N. of Scotland separate it from the Atlantic region. The region immediately at and around the N. Pole is covered with rough pack-ice, whilst Peary found the depth of the water at the N. Pole itself to be more than 1500 fathoms. The whole ocean, in fact, is covered with immense ice fields, which vary in depth from 5 to 30 ft. The average depth of the ice pack, however, is about 10 ft. It is frozen together in winter but in the summer it is broken up into floes of varying size. Lanes form in the ice pack, and when these lanes close up again the floes are piled up on one another, and the well-known 'hummocky' ice floes result. If hummocky ice is piled up against a shallow shore and so fixed for a great length of time, the appearance is produced which

Nares called the palaeocrystic sea. A permanent layer of fresh water is found in many places outside the edge of the ice pack. This layer, which has a depth of 6 ft. in some places, is formed partly by the melted ice and partly from the outflow of the rivers of Siberia. The ice pack as a whole has been found to drift from the middle of the N. coast of Siberia north-westwards towards the N.E. extremity of Greenland. Large quantities of ice also pass down each year between Spitsbergen and Greenland. The warm surface waters of the Atlantic flow up into the A. regions, passing between Greenland and Norway. When they arrive there they are chilled by contact with the icy A. waters, and gradually sink to the bottom. Finally they return, along the E. side of Greenland, and down Davis Strait, as a cold current carrying with them the icebergs which are such a danger to navigation in the Atlantic. The above is only an adumbration of the circulatory system which exists. The winds, the Gulf Stream, and the various submarine ridges and depressions between the continents and is., are all factors which complicate the movements of the waters. The A. O. is bordered by a fairly broad continental shelf; this renders the ocean as a whole shallow. Along the N. of Europe and Siberia, to 135° E. long. the water is very shallow indeed, and proceeding westward from this point the depth does not exceed 80 fathoms. Between Franz Josef Land and Novaya Zemlya the depth of the water varies from 100 to 150 fathoms, and between Norway and Bear Is. it is 240 fathoms. In the Kara Sea a depth of over 400 fathoms is found. The depth of the ocean E. of 135° long. suddenly increases to 2000 fathoms. The *Fram*, in 1893-96, drifted with the ice pack from 79° N. lat. and 138° E. long. into the neighbourhood of Spitsbergen, and the depth of the sea along her route was ascertained to be more than 1800 fathoms, and frequently over 2000 fathoms. The Nathorst expedition of 1898 found that the greatest depth W. of Spitsbergen was 1720 fathoms. The temp. of the A. O. is found to vary somewhat at different depths. The surface temp. in the polar regions is usually about the freezing point of salt water, 29.2°. It increases at about 110 fathoms to 33°, and between 120 and 350 fathoms the temp. is higher than at any other depth, ranging between 35° and 39.9°. This warm layer is probably due to the influence of the Gulf Stream. Directly underneath this, down to nearly 1000 fathoms, there is a drop in the temp. to about 31.9°. Lastly, from 1000 fathoms to the bottom the water is slightly warmer, and the temp. is fairly uniform, being between 33.1° and 33.4°. Near the Pole itself there appears to be no wind in the winter, and the air is clear; in lower lat., round Franz Josef Land and Greenland, for instance, whilst the temp. is higher, rough winds prevail. These are generally S.W. along the coast of

Norway, and as far as Franz Josef Land, but W. of this region northeasterly winds are general. During the summer fogs and mists are very frequent, and form one of the greatest dangers to explorers. The prin. riva. which flow into the A. O. are the Onega, the Dyina, and the Petchora in Europe, the Lena, the Yenisei, and the Obi in Asia, and the Mackenzie in America. The lofty A. lands are covered in the interior to an enormous depth with snow and ice, and vast glaciers are found in some places—for instance, the Humboldt Glacier on the W. coast of Greenland.



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#### ESKIMOS HUNTING AMONG THE ARCTIC ICEBERGS

The smaller seas and bays contained in the A. O., Baffin Bay, Bering Strait, Davis Strait, the Greenland Sea, the Kara Sea, the White Sea, etc. are described at length in separate articles.

**Arctiidae**, a family of lepidopterous insects; the tiger moths.

**Arctinus**, of Miletus, auct. Gk. epic poet, probably of the eighth century B.C. His life is unknown. His works, which are said to have included the *Athiopis*, a continuation of the *Iliad*, and *The Sack of Troy*, are lost except for a few fragments, collected in Kiinkel's *Epicorum Græcorum Fragmenta*.

**Arctium**. See BURDOCK.

**Arctomys** is the generic name of the marmots, which belong to the squirrel family (Sciuridae). They are small rodents found in the colder regions. *A. marmotta* is the Alpine marmot. The Amer. kinds are known as woodchucks.

**Arctostaphylos**, or bear berry, is a genus of plants found wild in the mountainous parts of England and Scotland, and the N. of Europe generally. It has been used in tanning and in dyeing a greyish-black colour as well as for

gravelly complaints and for diseases of the urinary organs.

**Arcturus**, or **Alpha Boötis**, perhaps next to Sirius, the best-known star, and the brightest in the N. sidereal hemisphere. It is one of the 11 stars brighter than the first magnitude and the sixth brightest in the heavens, its magnitude being 0.3. A. derives its name from 2 Gk. words, *ἀρκτος*, a bear, and *ὄψα*, tall. It is not in the constellation called Ursa Major (Great Bear), but is on a line drawn through the 2 hinder stars of the tail of the Bear. A. has been the subject of many literary references in auct. and modern times, and perhaps one of the oldest references to it is contained in the book of Job in the Bible (Job ix. 9 and xxxviii. 32), though possibly here, as elsewhere the name, of A. is wrongly used for the constellation the Great Bear. Hesiod in 730 B.C. refers to this star in his *Works and Days*. The poet Shelley, in *The Question*, uses the word in the plural, singing of 'Daisies, those pearl'd Arcturi of the earth, the constellated flower that never sets.' Astronomically A. has many points of interest, not the least being that it is the fastest-moving of the brighter stars, its velocity being 260 m. a second. Its 'proper motion' is 228" a century, which is very high. A. is approaching the earth at the rate of about 4 m. a second. It will however, take a long time to arrive, for its light, travelling at the rate of 186,000 m. a second, takes about 25 years to reach us. In type the star resembles our sun, its spectrum being full of metallic lines, but it is 2000 times more luminous.

**Arceuli**, a tn., Seine, France, 4 m. S. of Paris, of which it forms a suburb. Famous for ruins of an aqueduct built by the Emperor Julian. Pop. 15,000.

**Arcey**, **Grotto of**, a cavity in a hill in the dept. of the Yonne, France, about 3 m. S. of Vermenton. It contains various apartments, in some of which are found stalactites and stalagmites. The cathedral of Auxerre is supposed to have been built of stone from this grotto.

**Ard**: 1. A loch in the S.W. of Perthshire, Scotland. 2. A. or *Ard* means 'height,' and is found in many geographical names in Scotland and Ireland.

**Ardagh**: 1. A vil. in Longford, Eire, formerly the seat of a bishopric. Pop. 1500. 2. A vil. in Limerick, Eire. Pop. 1300.

**Ardalan**, dist. of Kurdistan, Iran (Persia), forming part of the prov. of Irak-Ajemi, and embracing the basin of the Shirwan Rûd. Area 6000 sq. m.: pop. 150,000. Chief tns. Kermanshah (pop. 70,000) (cap.) and Sinna.

**Ardashir**, the modern form of Artaxerxes, and the name of 3 Persian monarchs of the Sassanian dynasty. A. I., A.D. 226-11, founded this line by overthrowing Artabanus, the last Parthian king. A. II., who came to the throne 379, was deposed 383. A. III. was king, 628-30.

**Ardes**, auct. tn. of Italy, 24 m. S. of

Rome. The traditional cap. of the Rutuli. The modern tn. occupies the site of the anct. citadel.

**Ardebil**, a tn. of Azerbaijan, Persia, on the Kara-Su, 100 m. E. of Tabriz. Pop. 16,000. Favourite residence and the burial-place of Persian rulers. Suffered in Russo-Persian war, 1826-28. Stands on important caravan route.

**Ardèche**, 1. Riv. in dept. of same name, France. Rises in Cévennes and flows 60 m. into Rhône near Pont-Saint-Espirit. 2. Dept. in S.E. France. Area 2140 sq. m.; pop. 254,000. The dist., which includes part of anct. Languedoc, is mountainous and largely volcanic. Cap. Privas.

**Ardes**, a tn. of Louth, Eire, on R. Dee. It contains a thirteenth-century church, and 2 fourteenth-century castles. Pop. 1800.

**Ardemano, Teodoro** (1664-1726), was b. at Madrid, and was an architect, painter, and sculptor. He studied painting under Claudio Coello, and afterwards gave his time to mathematics and architecture. He painted the frescoes in the church of St. Francis, Madrid, and among his sculptures are the tombs of a dauphin of France and of a queen of Savoy. The cathedral of Granada is partly his work.

**Arden, Forest of**, dist. in N. Warwickshire, England, originally part of a forest which covered a large part of the midlands. Undulating and still well wooded. It is probably the scene of Shakespeare's *As You Like It*. His mother claimed to belong to the famous Arden family, founded in the eleventh century.

**Ardennes**: 1. Formerly the name of a large, hilly, and wooded dist. embracing parts of Belgium, Germany, and France; now applied to the wooded heights which extend from S.E. Belgium into France, on each side of the Meuse. The highest elevations are about 2000 ft. The industries of the dist. are pasturage and mining. This hill and forest region, watered by the Meuse and Aisne, was the scene of heavy fighting in the early days of the First World War, the Ger. invading armies marching to S.E. Belgium through Luxembourg in the S. Ardennes and through Malmédy near the N. part of the dist. The fate of Liège (Aug. 1914) cleared the road for the Gers. between A. and Visé when, under the duke of Württemberg and the crown prince, they resumed their advance by the hills to the Luxembourg railway lines. After the fall of Liège, Gen. von Bülow, on the pretext that the inhab. of the tn. of A. had attacked Ger. troops, ordered the tn. to be burned and 100 inhab. shot. It was in the A. in the Second World War that Gen. von Rundstedt (*q.v.*) opened his counter-offensive on the Belgian and Luxembourg frontiers on Dec. 16, 1944. In the new year, on Jan. 3, the Amers. launched a powerful counter-attack on the N. flank of the A. salient, which eliminated the last hostile threat and reduced the Gers. finally to a general defensive. See

**WESTERN FRONT IN SECOND WORLD WAR.** 2. Dept. of N.E. France, bordering on Belgium. Area 2020 sq. m.; pop. 245,335. Mézières is the cap. and Sedan the chief tn. The valleys are fertile, and there is much mineral wealth.

**Ardfert**, a vil. in co. Kerry, Eire, about 6 m. N.W. of Tralee. It is the see of a bishop. Pop. 1400.

**Ardglass**, a small seaport, fishing station, and bathing resort in co. Down, Eire. Pop. 500.

**Ardilaun, Arthur Edward Guinness**, first and only Baron (1840-1915). Educated at Eton and Trinity College, Dublin. Head of the great brewing firm of Arthur Guinness & Co. Conservative M.P. for Dublin, 1868-69 and 1874-80. Raised to peerage, 1880. Acquired St. Stephen's Green (Dublin) and Muckross estate (Killarney) for the public.

**Ardingly**, a vil. of Sussex, England, with public school of the same name; 40½ m. from London. Pop. 1,100.

**Arditi, Luigi** (1822-1903), It. musician and composer, b. in Piedmont, graduated at Milan Conservatory 1842. In 1846 he visited Havana as violinist with Bottesini, the double-bass player, and in 1847 went to New York as conductor of the Havana Opera Company. In 1858 he became conductor of His Majesty's Theatre, London, being Patti's favourite conductor. Operas: *La Spia*; *I Briganti*; and *Il Corsaro*. Also composed waltz songs, *Il Bacio* and *Fior di Margherita*. Pub. *Reminiscences*, 1896.

**Ardluke**, an Eskimo name for the grampus.

**Ardmore**: 1. Vil. and watering-place of Waterford, Eire, 6 m. from Youghal. Pop. 200. 2. Co. seat of Carter co., Oklahoma, U.S.A., home of the Chickasaw Indians, 98 m. N.E. of Fort Worth. Pop. 15,600. 3. Tn. of Montgomery co., Pennsylvania, U.S.A., 8 m. from Philadelphia.

**Ardnamurchan Pt.**, headland in Argyllshire, Scotland; the most westerly point of the mainland. The lighthouse on it was built in 1849.

**Ardnaree**, see BALLINA.

**Ardoch**, a vil. of Perthshire, Scotland, 8 m. S.W. of Crieff, containing the best-preserved Rom. camp in Great Britain. Pop. 985.

**Ardoye**, a tn. in the prov. of W. Flanders, Belgium. Pop. 6700. Noted for its cloth-weaving works.

**Ardres**, a tn. in the Pas-de-Calais dept., France. It manufs. lace, net, and arras. Pop. 2700.

**Ardrihaig**, a port of Argyllshire, Scotland, on Loch Gilp and the Crinan Canal, 19 m. S.W. of Inveraray. Pop. 1200.

**Ardrossan**, a seaport of Ayrshire, Scotland, burgh of barony and police burgh, governed by a provost and council. Important harbour, the construction of which was begun by Hugh, the twelfth earl of Eglinton, in 1806. The tn. is noted for its shipbuilding and fisheries, and there are collieries and ironworks in the neighbourhood.

A ruined castle with its dungeon, known as Wallace's Larder, may still be seen. Pop. 13,800.

**Ardsey:** 1. Now incorporated with Barnsley, E. A. par. and vil., 3 m. from Wakefield. Collieries, iron-smelting works, and railway works. Pop. 4000. W. A., 5 m. from Wakefield. Collieries and stone quarries. Pop. 9200. 2. Urb. dist. of W. Riding of Yorkshire, 3 m. from Wakefield. Pop. 7500. Has coal, iron, and woollen industries.

**Ardstraw**, a par. of Tyrone co., N. Ireland, comprising Newton-Stewart, A., and Douglas Bridge. Pop. 8097.

**Ardrea**, or **Artrea**, par. in Tyrone and Londonderry cos., N. Ireland, containing part of Moneymore. Pop. 5000.

**Arduni**, Carlo, an It. author (1815-1881). He became a journalist at Rome, and after the fall of the Republic of Mazzini went to Switzerland and was appointed prof. of It. language and literature at the Polytechnic, Zurich. Among his works are a hist. of Pícenum; *Stefano Porcari*, or *the Last of the Romans*, a drama, 1849; a work on the philosophy of Dante and on literature and art during the It. Renaissance; and one on the philosophy of the fine arts in Italy.

**Ardwick Limestone** is the name given to a calcareous series of beds in the upper part of the coal formation of the dist. round Manchester. It contains remains of shells and fish, and at Manchester has a coal-bed immediately above it.

**Ardwrock**, a castle near Inver, Perthshire, Scotland, where Montrose was imprisoned 1650. It is now in ruins.

**Ardys**, succeeded his father Gyges as king of Lydia, and reigned 678-629 B.C. He took Priene, and made war on Miletus. The Cimmerians, attacked by the nomads of Scythia, invaded the kingdom of A. See Herodotus, i. 14, 15.

**Are**, unit of Fr. land. A square measure, 1 side of which is 10 metres long.

**Area**, quantity of surface. The area of a rectangular surface is obtained in square units by multiplying the length by the breadth measured in the corresponding units of length. The area of a parallelogram = length multiplied by perpendicular height. Area of a triangle = half the length multiplied by perpendicular height. Area of a circle =  $\pi r^2$ , where  $\pi = 3.1416$  and  $r$  = radius. See **MENSURATION** and **SURVEYING** and under **WEIGHTS** and **MEASURES**.

**Areca**, a genus of Palmæ, grows in tropical Asia. *A. catechu* is cultivated all over India for its seeds, the pinang or betel nuts; mixed with lime and the leaf of the betel pepper it is universally chewed. *A. oleracea* or *Oreodoxa oleracea* is the cabbage palm of the W. Indian Is.; its leaves, which grow at the top of the tree, and its nuts are eaten, while the hard trunk is used as a water-pipe.

**Arecibo**, a city on the N. coast of Puerto Rico. Pop. 42,000. Chief exports are coffee and sugar. The harbour is dangerous. Near are the famous caves of Consejo.

**Areimanios**, see **AHRIMAN**.

**Arena**, the central part of an amphitheatre where the fights of the gladiators and wild beasts were held. Its name was derived from the Lat. *arena*, sand, and it was so called because it was usually covered with sand.

**Arenaceous** (Lat. *arena*, sand) **Rocks** is a term applied to those rocks which are formed of any variety of sandstone. The fine particles of quartz, of which sand consists, mingle with particles of other material, such as mica or felspar, and when cemented become rocks. When the clayey cement predominates they are known as *argillaceous rocks*.

**Arenal**, a small tn. of S. America, in the state of Miranda, Venezuela.

**Arenaria**, a genus of Caryophyllaceæ, is known in Britain as the sandwort. There are about 9 Brit. species. Many of the species are alpine; but the *A. verna*, or vernal, *A. sepylofolia*, or thyme-leaved, with others, are found upon the plain.

**Arenas**, **Puntas**, see **MAGALLANES**.

**Arensburg**, formerly a Ger. duchy of the Holy Rom. Empire; later it belonged to the Prussian administrative dist. of Coblenz. A. family is distinguished in Ger. hist. from early times.

**Arendal**, a Norwegian seaport, situated at the mouth of the R. Nid. Pop. 10,400. In the tn. and neighbourhood are paper, cotton, and wood-pulp factories and engineering and shipbuilding works.

**Arendonck**, a tn. in Antwerp prov., Belgium, noted for its manufs. of hosiery. Pop. 5,900.

**Arène**, Paul - Auguste (1843-96), a Fr. writer and poet. Amongst his earlier works are *Jean des Figues*, *Les Comédiens errants*, and *Le Duel aux lanternes*, and the 4 novels, *Le Tort d'Entraye*, *Le Clos des âmes*, *La Mort de Fan*, and *Le Canot des six capitaines*. He also wrote many critical essays and fantastic stories, as well as *Le Prologue sans le savoir*, 1818; *La Vraie Tentation de Saint Antoine*, 1879; *Vingt jours en Tunisie*, 1884; *Contes de Paris et de Provence*, 1887; and *Domine*, 1894.

**Arenenberg**, a castle on the borders of Lake Constance, Thurgau, Switzerland. It was the residence of the countess of Saint-Len, ex-queen of Holland, and of Prince Louis Napoleon, afterwards Napoleon III.

**Areng** is the name of one of the palms that produce sago and palm wine, found in all the Is. of the Indian Archipelago. The only species, *A. saccharifera*, has a trunk 20 or 30 ft. high covered with coarse black fibres. It yields a large amount of sap, which, when first drawn from the tree, is transparent. It soon becomes turbid and milky, and when fit for drinking is of a yellowish colour, with a large amount of astringency. It is very intoxicating. The coarse fibres are made into cables, and sago is obtained from the trunk.

**Arenicola**, see **LUG-WORM**.

**Arensburg**, a seaport on the Is. of Oesel, at the entrance of the gulf of

Riga, Latvia, which exports grains, timber, hemp, and skins. It contains an anct. castle, a Russian and a Lutheran church. It was taken by the Russians in 1710; pop. 5000.

**Arensky, Anton Stepanovitch** (1861-1906), Russian composer, b. in Novgorod. Studied under Zikhe, and, later, under Johansen and Rimsky-Korsakov at Petrograd Conservatory. In 1892 his first opera *A Dream on the Volga*, was successfully performed in Moscow. His other chief works are the opera *Nal and Damayanti* (1899), the ballet *A Night in Egypt*, and cantata *The Fountain of Bakhchisarai*. He also composed church music, songs, symphonies, and a set of variations for strings on a theme of Tchaikovsky and some chamber music. Much of his output is already forgotten, for, though akin to Tchaikovsky's, his music lacks the dramatic eloquence, to say nothing of the versatile technical equipment, of the latter.

**Areolar Tissue**, see CELLULAR.

**Areometer**, an instrument for measuring the sp. gr. of fluids. See HYDROMETER.

**Areopagitica**, a prose work of Milton, being, as its sub-title indicates, *A Speech for the Liberty of Unlicensed Printing*; pub. in 1644, and regarded as his greatest prose work.

**Areopagus**, 'the hill of Ares' (q.r.) in Athens, which gave its name to the judicial assembly of elders held there. It was of great antiquity, and was said to have taken its name from the legend of Ares having been tried there by Poseidon for the murder of his son, Halirrhothius. Its powers and functions were greatly increased by Solon, 591 B.C. It was formed of ex-archons and other men of high moral character, and exercised the right to inquire into men's incomes, to punish idleness and immorality, and to try persons for homicide and conspiracy. It came to an end c. A.D. 400. Paul preached on 'Mars' hill,' A.D. 52 (Acts xvii.).

**Arequipa**: 1. A coast dept. of S. Peru, divided into 7 provs. Area 21,947 sq. m.; pop. 360,000. Mountainous region with fertile valleys. Chief exports are fruit and vegetables, alpaca, coca leaves, and borax. 2. Tn. founded by Pizarro, 1539; pop. 145,000. Damaged by earthquakes in 1582, 1609, 1784, and 1868. Bishopric founded c. 1609. The cathedral was burnt down in 1849, but a new one was subsequently built. It is a univ. tn. with 3 colleges, a medical school, and a public library. It is connected with its port, Mollendo, 90 m. distant, by the A.-Puno Railway. The tn. was captured by the Chileans in 1883 during the war between Chile and Peru. 3. A volcano in Peru, also called Misti, its altitude is 20,000 ft.

**Ares**, the Gk. god of war, identical with Mars of Rom. mythology. The son of Zeus and Hera. He loved Aphrodite, and the pair were made a laughing-stock of the gods. He slew Halirrhothius, who had offered violence to his daughter Alcippe, and was tried

and acquitted on the Areopagus by the Olympian gods, which event is believed to have given rise to the name Areopagus. In the Trojan war he was wounded by Diomedes. The Aloidæ also conquered him, and imprisoned him for 13 months. His temple was on the W. slope of the Areopagus.

**Areson, John** (1434-1550), a prelate and poet of Iceland. The best-known of his poems is entitled *Lamentation on the Passion*. He opposed Protestantism, and fought against Frederick III. of Denmark, was taken prisoner and condemned to death. Printing was introduced into Iceland by him.

**Areteus**, a physician of Cappadocia who lived in Rome during the reign of Vespasian. He wrote 2 treatises in the Ionic dialect on the causes and indications of acute and chronic diseases, and on their treatment, which are still extant.

**Arethaphia** was the daughter of Agiator, and lived at Cyrene in the second century B.C. She was instrumental in killing both her husband, a tyrant of Cyrene, and her brother Leander. She was offered the crown but refused it.

**Arethusa**, one of the Nereids: name of sev. fountains, the most famous being in Ortygia, near Syracuse. In botany, a genus of orchids.

**Arethinian**, or Guldonian Syllables, in music, are those which were used by Guido d'Arezzo, c. 1030, for his hexachords. They were *ut, re, mi, fa, sol, la*.

**Arellino, Pietro** (1492-1556), b. at Arezzo, Tuscany; thought to be the natural son of Luigi Bacci. A writer of satirical sonnets, *sonetti lussuriosi*, burlesques, dialogues, and comedies. Banished from his native tn. on account of a sonnet against indulgences. For a time won the favour of the papal court. Was patronised by Giovanni de' Medici, who introduced him to Francis I. of France. His satire of contemporary court life won for him the name of the Scourge of Princes. His comedies are now regarded as his best work, but all his writings are tainted with licentiousness. A translation of certain of his works into Fr. was pub. under the title of *Académie des Dames*.

**Arellino, Spinello** (1316-1408), a distinguished It. painter, who was b. at Arezzo. He was the pupil of Jacopo del Casentino, and early obtained a reputation as a painter. He executed some frescoes, illustrating the life of San Niccolò, in a church of that saint at Arezzo; painted the prin. chapel of Santa Maria Maggiore, Florence; and the frescoes in the monastery of San Miniato, near Florence, in that of San Bernardo, Arezzo, and in that of Monte Oliveto, near Florence. Six of the frescoes illustrating the life of San Raniero, in the Campo Santo, Pisa, are by A., and are considered by Vasari to be among his best works. In the town hall of Siena are his works based on the life of Pope Alexander III.

**Arellino, Unico**, see ACCOLTI, BERNARDO.

**Arelinus, Guido**, see GUIDO D'AREZZO.

**Aresus** was the son of Acrotatus,



and succeeded his grandfather Cleomenes II. as king of Sparta in 309 B.C. He was attacked by Pyrrhus, king of Epirus, and was killed when engaged in battle in support of the Athenians against Antigonos Gonatas.

**Areus**, or **Areas**, a Pythagorean philosopher of the first century B.C. who was b. at Alexandria. He was one of the masters of Augustus, and it was owing to A. that Augustus spared Alexandria when Antony was defeated by him.

**Arezzo**: 1. Prov. in Tuscany, Italy. Area 1275 sq. m.; pop. 300,500. 2. Tn., cap. of the prov., episcopal see of Tuscany. The anct. Etruscan city of Arretium, terminus of the Via Flaminia. 308 B.C. made a 30 years' peace treaty with Rome; was besieged by the Galli Senones 283 B.C. Colonised by Sulla. During the Middle Ages it sided with the Ghibellines. Defeated by Florence at the battle of Campaldino, 1289; came completely under her rule, 1384. Dismantled by the Fr. in 1800. Guido Tarlati di Pietramala commenced the erection of the walls c. 1320. The cathedral, 1277, which is lt. Gothic, contains beautiful glass windows by Guillaume de Marcillat. There are many notable churches: Santa Maria della Morte, eleventh century; Santissima Annunziata, thirteenth to fourteenth century; San Francesco, 1322. The tn. is the bp. of many famous men, including Petrarch, Vasari, Pietro Aretino, and Guido of Arezzo. Pop. 60,300. Its pre-1940 industries included silk, macaroni, gunpowder, pottery, and tanning. There is a technical school and an academy of science, arts, and letters. In the allied advance in Italy in 1944 A. was entered by the Eighth Army on July 16. The city suffered considerable damage in the Second World War, though, at least, the damage was concentrated in the modern quarter near the station. But shells holed the cathedral and broke all the windows. Heavy calibre bombs hit the abbey. Considerable damage was done to the roof of San Bartolomeo and the facade cracked. The church of S. Bernardo was almost demolished. Damage more or less severe was also sustained by the churches of San Lorenzo and San Francesco. The Palazzo del Capitano del Popolo was half destroyed by bombs, and the interior of the Palazzo Altucci was to a considerable extent destroyed. Also the Casa di Petrarca was largely demolished; serious damage was done by a bomb which struck the Museo Civico, a number of paintings, which had inadvertently been left on the walls, and a collection of ceramics being either destroyed or more or less severely damaged. In the abbey Vasari's painting of 'The Banquet of Esther and Ahasuerus' very fortunately escaped damage but for a few scratches. The best individual items of the Archaeological Museum had been removed to Florence for safety.

**Arfaks Mts.** are situated in New Guinea; the highest elevation is 5000 ft.

**Arfe**: 1. Henrique de A., a distinguished Sp. silversmith, who lived in the early part of the sixteenth century. He made the silver tabernacles of the cathedrals of Leon, Cordova, and Toledo, and also that of the Benedictine monastery of Sahagun. 2. Juan de A. y Villafane, b. at Leon in 1535, was the grandson of the above, and was employed by Philip II. and Philip III. He was the artist of the tabernacles of Avila, Seville, and Osmas, and he made tabernacles for the cathedrals of Burgos and Valladolid, and for the church of St. Martin at Madrid. He wrote *Quitador de Oro, Plata, y Piedras*, Valladolid, 1572; and *Varia Commensuracion para la Escultura y Arquitectura*, Seville, 1585.

**Arfredsonite**, a dark green mineral which occurs in igneous rocks such as nepheline-syenite and phonolite. Its composition is indicated by the following formula:



**Argæus**, a mt. in Cappadocia, Asia Minor. Extinct volcano, 13,100 ft. high. Now called Arjish-Dagh.

**Argali**, the name of a species of wild sheep found in the steppes of Siberia and the mts. of Central Asia. It is the *Ovis Ammon* of Pallas. There are many species in Central Asia, and a similar sheep is found in the Rocky Mts. of N. America and another species in the Himalaya Mts. See SHEEP.

**Argall, Sir Samuel** (c. 1580-c. 1626), Eng. adventurer, b. at Bristol; went to Virginia, 1609; gained the release of sev. Englishmen held captive by Powhatan, a Potomac chief, by abducting his daughter, Pocahontas, in 1612; destroyed Fr. settlements of Mt. Desert, St. Croix, and Port Royal, in Nova Scotia, in 1613; became deputy-governor of Virginia in 1617, resigning on account of charges of tyranny and rapacity in 1619. In 1621 he commanded a fleet against the Algerine pirates in the Mediterranean; was knighted in 1622; in 1625 commanded an Anglo-Dutch fleet against Spain, and died while with Cecil's expedition against Cadiz.

**Argand, Aimé** (1755-1805), b. at Geneva and d. in England; was a chemist who first invented lamps with a burner which admitted air to the flame.

**Argand Burner**, a burner for an oil lamp, in which the wick is in the form of a hollow cylinder, so that air rises within and without the flame, procuring more complete oxidation and therefore a brighter light. The addition of a cylindrical chimney creates a greater draught, at the same time promoting steadiness of the flame by preventing side draughts. The same principle is used in gas burners where the gas is admitted into the space between 2 hollow cylinders. This space is closed at the bottom and provided at the top with a series of small holes through which the gas issues.

**Argao** tn. on the E. coast of Cebu,

Philippine Is. Founded 1608; pop. 40,000. Products are rice, Indian corn, cacao, and cotton. The language is Cebu-Visayan.

**Argaum**, in the Deccan, S. India, where Sir Arthur Wellesley defeated the united forces of Sindhia, a Mah-ratta chief, and the Bhonsla, the rajah of Berar, on Nov. 29, 1803.

**Argeli** (*Ἀργείοι*) is a name Homer sometimes makes use of to describe the whole body of Gks. at Troy. It was probably derived from the inhab. of Argos, which was even then a well-known place. Additional weight is given to this theory by the fact that Argos was used by Homer to designate the whole of the Peloponnesus.

**Argel**, or **Arghel**, the *Solenostemma* A., a species of the order Asclepiadaceæ found in Syria, Arabia, and Africa. Its leathery and acrid leaves are sometimes used in the adulteration of senna.

**Argelander**, Friedrich Wilhelm August (1799-1875), a famous Ger. astronomer, b. at Memel; educated at the univ. of Königsberg. In 1820 became assistant to F. W. Bessel; was director of the observatory of Abo, 1823, and later of Helsingfors, 1832. Appointed prof. of astronomy in the univ. of Bonn, 1837. In 1822 there appeared his treatise on the path of the great comet of 1811, and in 1837 he pub. his researches on the sun's motion in space.

**Argens**, Jean Baptiste de Boyer, Marquis d' (1704-71), Fr. writer. Pub. *Lettres juives*, 1738-42; *Lettres chinoises*, 1739-42, *Lettres cabalistiques*, 1769; and *Mémoires secrets de la république des lettres*, 1743-48. He was b. at Aix in Provence, and entered the army at 15. Most of his writing was done at Amsterdam. He was invited by Prince Frederick (afterwards Frederick the Great) to Potsdam, but his marriage to Mlle. Coëhois, a Berlin actress, offended his patron, and he was obliged to return to France. D. near Toulon.

**Argensola**, Bartolomé Leonardo de (1562-1631), Sp. poet and historian. He pub. in 1609 *Conquista de las Islas Molucas*; and in 1630 a supplement to Zurita's *Anales de Aragón*; in 1634 his poems, which are witty and satirical, appeared with those of his brother. He took holy orders, and was attached to the suite of the count de Lemos. In 1613 he succeeded his brother as historiographer of Aragón.

**Argensola**, Luperco Leonardo de (1559-1613), Sp. dramatist and poet. His tragedy *Filís* is lost; *Isabela* and *Alejandro*, imitations of Seneca, were pub. in 1772. His poems, being translations from Lat. poets and some original satires, were pub. with those of his brother in 1634. In 1585 he was appointed secretary to the duke of Villahermosa, and in 1610 he accompanied the count de Lemos to Naples, where he d. 1613.

**Argenson**, Marc Antoine René de Voyer, Marquis de Paulmy d' (1722-87), Fr. diplomatist and man of letters; son of René Louis de Voyer d'A. Collected the

famous Bibliothèque de l'Arsenal, containing 150,000 vols., which was sold after his death to the Comte d'Artois. Pub. *Mélanges tirés d'une grande bibliothèque*, 1779-87.

**Argenson**, Pierre de Voyer, Vicomte d' (1626-70), fifth governor-general of Canada (1658-61). Educated for the priesthood but forsook the Church for the Army. Came to Quebec in 1658, 1 year after his actual appointment. His tenure was marked by a dangerous attack on the Fr. establishments in Canada by the Iroquois, an attack which was checked by the heroism of the garrison at Long Sault under Dollard. He returned to France in 1661 and rendered distinguished service in the royal armies. It was during his tenure that de Laval arrived in Quebec as first bishop of Quebec and Canada.

**Argent**, see HERALDRY.

**Argenta**: 1. A tn. in Central Italy, 21 m. by rail S.E. of Ferrara. Pop. about 27,000. Most of the tn. was destroyed in the Second World War, and the rest damaged by shell fire. The old brick church of S. Domenico was, however, only slightly damaged, but sev. other famous churches were either destroyed or damaged beyond repair. 2. A city in Pulaski co., Arkansas, U.S.A. Pop. 11,000.

**Argenta**, Jacopo Filippo d', an It. miniaturist of the fifteenth century. He did exquisite work in choir-books, specimens of which are still to be found in the communal library at Ferrara.

**Argentan**, cap. of arron., dept. of Orne, N.W. France; bp. of the historian Mézeray and of Charlotte Corday. Important pre-war industries were stained glass and leather work. It was the scene of severe fighting in the battle of Normandy, 1944. Pop. 5900.

**Argentario**, or **Argentaro**, mt. of Grosseto, Tuscany, Italy, forming a peninsula jutting into the Mediterranean immediately W. of Orbetello. Its culminating point is 2082 ft. high. The harbours of Porto Ercole and Porto San Stefano lie at the foot.

**Argentara**, mt. of Cuneo, Piedmont, Italy, about 10,800 ft. high, forming the highest summit of the Maritime Alps. First ascended in 1879 by Mr. Coolidge.

**Argenteuil**, tn. in the dept. of Seine-et-Oise, N. France. Pop. 59,000. Manufs. are iron goods, chemical products, and plaster. Asparagus, figs, and grapes are cultivated.

**Argenteus**, Codex, or **Silver Book**, the name of a MS. containing the greater part of the 4 gospels in the Meso-Gothic language, now in the library at Upsala, Sweden. It was discovered in the abbey of Werden, Westphalia, and is believed to be a relic of the Gothic Bible trans. by Ulfilas, who lived in the fourth century A.D. The leaves are of vellum, the initial letters are in gold, and the others in silver. The Gothic gospels of the Silver Book were first printed in types approaching to a facsimile by Junius,

1665; in Stockholm, 1671; by Edward Lye at Oxford, 1750; and by Zahn, Weissenfels, 1855.

**Argentières**, vil. in the dept. of Haute-Savoie, France, 6 m. N.E. of Chamonix. In the vicinity is the famous glacier of A., which is the largest in the Mont Blanc group.

**Argentières**, L'. 1. A tn. in the dept. of Hautes-Alpes, France. Pop. 1700.

**Argentina** (Lat. *argentum*, silver), a deep-sea smelt with silvery scales, found in Europe. It belongs to the Salmonidae, and is related to the salmon, trout, and char. Artificial pearls are made from the scales.

(4) Military Zone. There is also the federal dist. of Buenos Aires (71 sq. m.).

**Physical Features.**—The country is very mountainous and rugged in certain dists. The Andes form a continuous chain of mountainous highland, with an average height of 13,000 ft. S. of Buenos Aires there is an extensive mountainous range, the Sierra Ventana. The country is well watered, the prin. rivs. being the La Plata, Paraná, Uruguay, Río Negro, Chubut, and Gallegos. In the N. and E. there are fertile valleys, and wide tracts of lands which for agric. and pastoral purposes could hardly be surpassed. In Patagonia



Canadian Pacific

BUENOS AIRES, LOOKING TOWARDS THE HARBOUR

**Argentine Republic**, or **Argentina**, a federal republic of S. America; its name is derived from the Río de la Plata (riv. of silver). It is bounded on the W. by the Andean range of mts., which separates it from Chile; on the N. by Bolivia, and on the N. and E. by Paraguay, Brazil, Uruguay, and the Atlantic Ocean. Area 1,112,000 sq. m.

The country is divided into provs. and ters. There are 14 provs.: (1) In the N., Salta and Jujuy. (2) On the coast, Buenos Aires, Santa Fé, Entre Ríos, Corrientes. (3) The central provs. of Córdoba, San Luis, Santiago del Estero, and Tucumán. (4) The Andean provs. of La Rioja, Catamarca, San Juan, and Mendoza. The ters. are 10 in number, and are: (1) Neuquén, Río Negro, Chubut, Santa Cruz, and Tierra del Fuego, which form the dist. known as Patagonia. (2) Pampa. (3) Misiones, Formosa, and Chaco in the N.

and to the centro there are vast plains known as pampas, which are covered with shingle and interspersed with clumps of thorny brushwood and tall thistles.

The climate for the most part is temperate and healthy. That part of the country which lies N. of the tropic of Capricorn is extremely hot, and the S. ters. are bleak and windy. High, stormy winds, known as pamperos, blow on the coast from the Atlantic.

**Products and Industries.**—The main industries are agriculture, the pasturage of live-stock and forest products being 95 per cent of the whole. Wheat, oats, maize, and linseed are the prin. crops. Alfalfa, for feeding livestock, is a very successful crop. Cotton, potatoes, sugar, vine, tobacco, rice, and yerba maté (Paraguayan tea) are also cultivated. Other products are peanuts and sunflower seed. The vine is cultivated in Mendoza and

**San Juan** and the wine export to other S. Amer. states is increasing, being valued at £500,000 yearly. Meat-packing houses have been estab. on a large scale, and meat refrigeration is the chief industry. Flour-milling is next in importance. The A. has commerce with practically all the European countries and with the U.S.A., but the greater part of the trade is with Great Britain and France. The prin. exports are: beef and mutton, wheat, maize and linseed, wool, skins and hides, tallow, sugar, spirits, dried fruits, and maté or Paraguay tea.

The minerals of the country might be much more developed than they have been in the past. Some gold is found in Patagonia and in the sub-Andean regions to the N.W. Other minerals are silver, copper, lead, iron, coal, tin, and cement. Tungsten is an important mineral; others are borax, salt, and limestone. Oil has now been found and the A. State Oil-fields at Comodoro Rivadavia produce about 1,129,000 metric tons annually. While the output of private companies is nearly 2,000,000 metric tons.

**Fauna.**—Numerous species of animals exist, of which may be named the chinchilla, fox, skunk, guanaco, coypu, biscacha, armadillo, deer, and ostrich. Birds of beautiful plumage abound, as, for example, parrots, flamingoes, and humming-birds. The extensive pasturage of live-stock has greatly decreased the numbers of wild cattle and horses.

**Population.**—(1914) estimated to be 13,910,000. A census taken in 1774 gives the Buenos Aires dist. pop. as 6000. In 1824 it was only 80,000. In 1869, the year of the first regular census, it was 315,000. The pop. in 1945 was 2,621,000. The extraordinary increase in the past 60 years is explained by immigration. Of the tens. of the Pampa, the ports have grown most rapidly: Rosario, 91,000 (1895), 245,000 (1914), 265,000 (1922), 522,000 (1944); Bahía Blanca, 9000 (1895), 44,000 (1922), 120,000 (1944). The areas of greatest density, however, remain the maize area in the Buenos Aires and Santa Fé provs., and the old agric. colonies on the Middle Salado. In 1914 foreigners numbered 30 per cent of the total pop., all being European except a few tens of thousands of Bolivians and a few thousand Brazilians and Chileans. Immigration is now more under control; in 1919 legislation was passed which requires intending immigrants to produce certificates of good character and ability to work. In 1926 immigrants numbered 340,316; emigrants, 249,475. The general language spoken is Sp., but there are so many immigrants of different nationalities that there is a variety of languages spoken.

The national religion is Rom. Catholicism, but toleration is afforded to other religions.

**The Constitution** is modelled on that of the U.S.A. The president, who must be a Rom. Catholic and a born citizen of the republic, is elected for 6 years, and is assisted by a vice-

president and a Cabinet of 5 ministers. There is a Congress of 2 houses: the Senate, composed of 30 members elected for 9 years, and the Chamber of Deputies, composed of 153 members elected for 4 years, one-half retiring every 2 years. There is also provincial self-gov., which is republican in form.

The Army is a national militia, service in which is compulsory for all citizens between 20 and 45 years of age. After 10 years in the 'active' army, the men serve in the National Guard for 10 years and conclude with 5 years in the Territorial Guard, which latter is only mobilised in war. The Army is organised in 5 divs., 3 cavalry brigades, and 2 mt. detachments. In 1938 the strength was about 40,000 men. The trained reserve numbered 300,000 men. The Navy comprises 2 battleships, 3 cruisers (under 7000 tons), 4 old coast defence ships, 11 destroyers, 3 submarines, 2 patrol vessels, and 14 mine-sweepers. The battleships and coastal defence ironclads have been modernised. The Air Force is organised in 4 groups, each comprising 3 reconnaissance and 1 fighting group. The number of aircraft (1938) was only 150. The Air Force to-day comprises 9 reconnaissance groups and 3 fighting groups.

**Education** is compulsory for the ages of 7 to 14. Primary education is free, being subsidised by the General and Provincial Govs., and secular. Secondary education is also free, but not compulsory. It is controlled by the National Gov. in over 50 national colleges. Normal colleges, mining, agric., commercial, industrial, and training schools are also sustained at public cost. There are national univs. at Buenos Aires, and at Córdoba, which latter has an astronomical observatory. There are 5 provincial univs., the prin. being at Paraná, Santa Fé, Tucumán, and La Plata. The univ. of Cuyo for the provs. of Mendoza, San Luis, and San Juan was founded in 1921.

**Chief Towns.**—Buenos Aires, the cap. of the country, on the estuary of the La Plata, was founded by Don Pedro de Mendoza in 1535. It was made a bishopric in 1620, and a viceroyalty in 1775. It is an important commercial and educational centre and owns flourishing engineering works. Its pop. in 1905 was about 1 million. The prin. tns. are: Buenos Aires, pop. (1945), 2,621,000; Rosario, 522,000; Córdoba, 289,000; Avellaneda, 231,000; La Plata, 200,000; Santa Fé, 154,000; Tucumán, 158,000; Bahía Blanca, 120,000; Ilo Cuarto, 90,000; Lomas de Zamora, 90,000; Mendoza, 102,000; Paraná, 76,000; Corrientes, 68,000; Quilmes, 61,000; Tandil, 58,000; Chivilpoy, 58,000; Mar del Plata, 60,000; Santiago del Estero, 76,000.

**Communications.**—The Rs. Paraná and Uruguay are important channels of trade. In 1939 there were 26,840 m. of railroad, mostly in the hands of Brit. companies, the Brit. capital sunk being £234,000,000. The Córdoba Central railway, from the cap. to Tucumán, is the chief line. There are

now over 30,000 m. of telegraphs and over 50 wireless stations (1939), 1 of which is reserved for communications with England. Sev. aeroplane services are also in operation. There are tramway lines in all the important tns.

The A. R. has not produced many great names in the realm of literature and science. Gregorio Funes (1740-1830), rector of the univ. of Córdoba, was an eminent historian, who won a reputation not merely in his own country, but in the U.S.A. and in Europe. President Sarmiento, during his term of office (1868-74), founded the observatory at Córdoba. The first director of the observatory was Benj. Apthorp Gould (1824-96), a scientist of the first rank, whose brilliant research work did much to kindle an interest in scientific matters. *See further under SPANISH AMERICAN LITERATURE.*

The gold peso or dollar is the unit of value, and equals 96.5 cents. By a law passed in 1899, the paper peso equals .44 of the gold peso. The revenue of the country is chiefly derived from customs and excise, which are heavy. The country has suffered from the unscrupulous use of national credit to promote private enterprise. The internal troubles of the last half-century have caused frequent financial panics, with consequent forcing of paper currency. All banks, national and provincial, are now under the direct control of the State.

*History.*—The country was first visited by Spaniards in 1516. A company of adventurers, under the leadership of Juan Díaz de Solís, landed near the Rio de la Plata in search of a passage S.-westward to the E. Indies. Four years later the Sp. king, Charles I. (better known as Emperor Charles V.), sent Ferdinand Magellan, a Portuguese, on an expedition round the world. Magellan arrived at the wide estuary of the R. Paraná, and being convinced that there was no passage through to the W., he likewise left the country. In 1526 Sebastian Cabot, once a favourite of Henry VIII. of England, now the pilot-major of Charles of Spain, went to La Plata to make astronomical observations. On hearing of mineral wealth in the interior, however, he abandoned his primary object and began exploring. He explored up the Rs. Paraná and Paraguay, built a fort on the Uruguay, and founded a settlement a little beyond the N. of R. Carcarañá, which he called San Espiritu. The Indian ornaments of heavy silver which he sent home to Spain gave the country a reputation of great wealth, and the estuary of the Paraná was called the Rio de la Plata, or the Silver R., in consequence. In 1534 a Basque nobleman, Pedro de Mendoza, organised an expedition on a larger scale than had been attempted before. He arrived at La Plata in the following year and laid the foundations of a Sp. settlement at Buenos Aires. Mendoza suffered great losses. His company of 2500 men was reduced to

500 in 2 years, partly from the repeated attacks of the Indians, and partly through the ravages of disease. Mendoza himself returned to Spain in 1537. His lieutenant, Domingos Martínez de Iralá, remained in the country, and founded the first permanent Sp. settlement in the interior of S. America at Asunción, which for many years remained the headquarters of Sp. gov. In 1538 Iralá was proclaimed by his fellow countrymen the captain-general of the Rio de la Plata. The settlement at Buenos Aires had failed through the assaults on the colonists by neighbouring tribes of Indians. An attempt to re-establish the city was made in 1542 by Cabeza de Vaca, but with no success. In 1580 Juan de Garay, who in 1573 had founded the city of Santa Fé, rebuilt Buenos Aires, and endowed it with a corporation and full Sp. municipal rights. He defeated the Indians, and obtained complete mastery over them. By this time, the Spaniards had penetrated as far as the Andes. Tucumán was founded 1565, and Córdoba 1573. In 1620 Buenos Aires became separate from the local Sp. gov. at Asunción, though it remained under the authority of the viceroyalty of Peru. The colonists were very discontented under the yoke of the home gov. Spain jealously forbade all European powers to trade with her colonies or to settle in the country. This meant commercial ruin to the ports. In 1618, Spain allowed Buenos Aires to send out 2 ships loaded with products of the land. Buenos Aires was prevented also from having any internal trade with Peru by the exorbitant customs duty of 50 per cent, which was levied at Córdoba on all goods sent to or from Buenos Aires. This duty was reduced in 1665, but it was not till 1776 that the policy of exclusion was finally abandoned. In 1713, by the treaty of Utrecht, England gained the right to import negro slaves into Sp.-Amer. colonies. *See ASSAULTO.*

The life of the early settlers, therefore, was not very prosperous. Not only was their trade crippled through the unwise administration of the mother-country, but they themselves were continually harassed by attacks from the native Indians. In 1776, Buenos Aires was made the cap. and seat of the viceroyalty, with jurisdiction over the neighbouring tns. now known as the republics of Paraguay, Uruguay, Bolivia, and the A. Federation. During the period of the Fr. Revolution, Spain and France combined against Great Britain, and the Amer. colonies came in for a share of the warfare.

In 1806 Gen. Beresford besieged Buenos Aires, but was repulsed by the inhab., and in the following year Gen. Whitelock assaulted the tn. and was also compelled to capitulate. The colonists were so elated at their victories, unaided by the Sp. or Fr. armies, that their thoughts inevitably turned towards independence. In the meantime Napoleon had entered Madrid,

and proclaimed his brother, Joseph Bonaparte, king of Spain, and the colonists were not bound by any feelings of loyalty to the Fr. rule. On May 25, 1810, a provisional junta was formed, which marks the beginning of the republic. During the following 4 years, the war of Independence took place, Manuel Belgrano and José de San Martín being the 2 prominent revolutionary leaders. In 1816 a congress of deputies was held at Tucumán, when Don Martín Pueyrredón was elected supreme dictator. Spain was defeated by the combined forces of Chile and Buenos Aires at Chacabuco in 1817, and at Maipú in 1818, but it was not till 1842 that Spain formally acknowledged the independence of the A. During the first half-century of the republic the country was disturbed by continual civil war, due to the jealousy of the provs. of Buenos Aires and to the dissatisfaction of the remaining Sp. adherents. In 1826-28 war was waged with Brazil for the possession of Uruguay. The Brazilians were defeated at Utuzaingo, and Uruguay became independent under the name of Monte Video; in 1838-42 there was war with France; and in 1865-70 occurred the Brazilian-A. war against Paraguay, due largely to the arrogance of Francisco Solano López, president of Paraguay, who had invaded A. ters. He was defeated and killed in 1870 by Mitre, the A. president and general, and peace was restored. Up to comparatively recent years the country was harassed by internal revolutions, which frequently involved a general financial crisis. Towards the end of the nineteenth century the relations between Chile and the A. were embarrassed by quarrels over the boundaries. The A. prepared for war by increasing its navy. The boundary protocol was signed with Chile in Dec. 1900. In the following year the 2 countries referred the question of the frontier to the arbitration of Great Britain, and in consequence war was averted. The death of President Manuel Quintana took place in Mar. 1906, when the vice-president José Figueroa Alcorta assumed presidential office. He was succeeded in 1910 by Roque Sáenz Peña, with Victoriano de la Plaza as vice-president.

Throughout the First World War A. remained neutral, though the bulk of the pop. sympathised with the allied cause. The volume of trade with Germany, though inferior to that with Britain, was great, and the Ger. element in the pop. was by no means negligible. Moreover the Ger. communities were well organised to meet all eventualities, and Brit. propagandist work in A. being poorly conducted, they had but little difficulty in preserving the *status quo*. One of the most significant events in A. hist. in these years was the election of the Radical leader, Dr. Hipólito Irigoyen, to the office of president. Never previously had the Radicals secured control of the gov. in so proudly

conservative a country as the A. During 1917 a serious railway strike, probably fomented by Ger. agitators, brought about acute political tension. Irigoyen's democratic sympathies were said to have indirectly encouraged the outbreak. About this time the notorious *spurious versenkt* warning as to Ger. U-boat intentions was sent to the A. Gov. Sev. A. boats were in fact sunk. The U.S.A. had joined the Allies. Feeling ran high in the A., but though numerous volunteers migrated to join the allied armies, neutrality was preserved.

It is considered by most Pan-Amers. to be an outstanding achievement of the president that in spite of the strongest inducements from outside to join the Allies he kept A. out of the First World War. This abstention enabled the country to make headway in commerce, and, in 1938 the foreign trade was valued at 2861 million pesos. Imports and exports were, respectively, 1461 million and 1400 million pesos. In domestic affairs the chief features of Irigoyen's first administration were the introduction of a minimum wage to save the working classes from the effects of an inflated currency, the raising of the railway tariff, and the unwavering support of national and provincial constitutions. Irigoyen, who had been the chief political force in A. ever since he assumed a commanding position 40 years previously, at first refused to stand for the presidency, partly, perhaps, because he underestimated the chances of his party and partly because his immense estates occupied so much of his attention. He was, however, again inaugurated president in 1928 and but for the revolution of 1930 would in the ordinary course have held office till 1934. The most significant event in the foreign policy of A. in recent times is the unequivocal championship of the complete sovereignty of the S. Amer. republics, untrammelled by any implications or even by the mere existence of the Monroe doctrine. In 1930 a revolution took place, which ended the Gov. of President Irigoyen. The *coup d'état* was effected by a combination of all the fighting services directed by a junta under Gen. Uriburu. The course of the revolution was swift and accompanied by relatively small loss of life and damage to property. The new Gov., the members of which were all men of marked Conservative tendencies, dissolved Parliament but promised to respect the Constitution. The cause of Dr. Irigoyen's downfall was, apparently, popular discontent with one-man rule bordering on dictatorship, a discontent aggravated by economic depression, much the same causes as had led to similar forcible changes in the Govs. of Bolivia and Peru a few weeks earlier in the same year. The *de facto* Gov. estab. after the revolution of 1930 was succeeded by a constitutional régime in Feb. 1932, when Gen. Justo was made president in succession to Gen. Uriburu. In the interest of Brit.

trade a Brit. Empire Exhibition was held at Buenos Aires in 1931, and was opened by the Prince of Wales (Edward VIII.). President Castillo pursued a neutral policy in the Second World War. His policy was not unpopular in A., though in neighbouring countries it was construed as a pro-Nazi policy. In June 1943 there was a military rising at the Campo de Mayo, the great A. military centre, and Dr. Castillo surrendered to the revolutionaries and resigned the presidency. Gen. Rawson, the insurgent leader, issued a manifesto, calling for 'a loyal Amer. union and collaboration, and the fulfilment of pacts and continental undertakings.' But one of the fundamental causes of the revolution is said to have been the alarm prevailing in A. military circles at the arming of A.'s neighbours, notably Brazil, while owing to Castillo's neutrality policy A. could not buy arms. As the United Nations were then the only source of arms, A. inferiority could be remedied only from that quarter: but under Castillo A. had gone so far along the road of isolation that she could not turn back without a change of masters. Towards the end of 1943, however, relations between the United Nations and A. greatly deteriorated on account of the openly Fascist character of the Ramirez dictatorship. In Jan. 1944 the A. Gov. announced the ending of diplomatic relations with Germany and Japan, but there was no real change of heart in official circles and, despite the fact that the great majority of the people were democratic in sentiment and friendly to the United Nations, the A. Gov. continued to tolerate widespread Ger. and Jap. espionage and, probably, collaborated with Gers. in fostering unrest throughout S. America. Moreover relations between the Ramirez Gov. and Franco's Gov. in Spain continued to be as close as ever. But throughout most of the period from the revolution of June 1943; the A. Gov., partly under pressure of external events, had veered steadily towards the left—whence the frequent changes of presidents and ministers. The end of 1945 saw the rise of a 'Caudillo' in the person of Col. Juan Domingo Perón, who had been secretary of the War Ministry in June 1943, and, since then, secretary of labour and welfare, president of the Post-war Council, and, finally, vice-president of A. He was imprisoned by the dictatorship, in the is. of Martín García, but owing to the insistent clamour of the A. workers, was brought back to Buenos Aires as the *de facto* leader of the country. In the general election of Feb. 1946, which was held in an atmosphere of turbulence and violence, Perón was, in effect, the official candidate, and stood for the presidency as the self-proclaimed champion both of the masses against the plutocracy and of A. against the U.S.A. He had the support of part of the army and the allegiance of a large and well-trained police force, who regarded him as a demigod and constituted a veritable Praetorian Guard. During the A. election campaign the Amer. Gov. pub. a memorandum, which

it had addressed to the Pan-Amer. Union, in which evidence from Germany was adduced indicating a continuing partnership between the military dictatorship and an elaborate Nazi organisation in A., and quoting Perón himself as aiming at a 'thoroughly regimented totalitarian State dedicated to the pursuit of a warlike life and a war economy.' Perón's opponent was Dr. Tamborini, a man devoid of Perón's glamour and mystic appeal, who had been minister of the interior from 1925 to 1928. Tamborini was the spokesman for all those who hated Perón, ranging from wealthy landowners and captains of industry to the workmen's leaders and left-wing agitators whom Perón had once imprisoned in the bleak wilds of Patagonia. He also represented his own party, the Radicals, and the democratic union of Socialists, Communists, and progressive democrats, though in A. party and programme count for far less than does a colourful and dynamic personality. The Navy was opposed to Perón because it believes that soldiers should not rule, while the Catholic Church veered towards him on account of the disapproval of Socialists and Communists, and because the Radicals had included the principle of lay teaching in their programme. It was against all this strange and troubled background that Col. Perón was now making his bid for power, and in June (1946) he was inaugurated president amidst scenes of remarkable popular enthusiasm, particularly among his working-class supporters.

*Bibliography.*—W. H. Koebel, *Modern Argentina*, 1907, and *Argentina: Past and Present*, 1910; W. B. Parker, *Argentines of To-day* (New York), 1920; C. R. Knock, *The Republics of Central and South America* (London), 1922, *Spanish America* (2 vols.), 1920, and *The New Argentina*, 1923; W. E. Browning, *The River Plate Republics*, 1928; F. A. Kirkpatrick, *A History of the Argentine Republic*, 1930; Ricardo Levene, *A History of Argentina*, 1938, and *Historia de la Nación Argentina* (Buenos Aires), 10 vols., 1942; J. Gunther, *Inside Latin America*, 1942; R. A. Ruiz y Ruiz, *Historia Civil Argentina*, 3 vols. (Santa Fé), 1942; J. W. White, *Argentina: The Life Story of a Nation* (New York), 1942; Y. F. Ronnie, *The Argentine Republic* (New York), 1945; P. E. James, *Latin America* (New York), 1946.

**Argentine**, tn. of Wyandotte co., U.S.A., on the Kansas R., 4 m. W. of Kansas city, became part of the latter in 1910.

**Argentite**, or **Silver Glance**, a mineral of the galena group, occurring in isometric crystals. Consists of sulphur and silver, and is found in Cornwall, the Urals, and generally in N. European countries.

**Argenton-sur-Creuz**, a tn. of W. France, dept. of Indre; pop. 5575. Manuf. of shoes and linen goods. 'Excellent wine is produced.

**Argol**, see **ARUKL**.

**Argillaceous** (Gk. ἀργίλλος, clay. Rocks is a term applied to those rocks which are formed entirely or partially of clay (q.v.).

**Argillite**, see PORCELLANITE.

**Argives**, a name given to the Gks.; derived from the city of Argos, which is reputed to be the oldest city of Greece.

**Argo**, the Ship, is the largest of Ptolemy's 15 S. constellations. It is so large that much confusion prevailed formerly as to the names of its different parts. To obviate this difficulty Sir John Herschel suggested its div. into Carina, the Keel; Puppis, the Stern; Vela, the Sails, and Malus, the Mast. A part of Malus was called by Lacaille Pyxis, the Compass. The greater part of the constellation which lies E. of Columba and Canis Major is not visible in Britain, and it is this part which contains all the more important stars. Canopus is the only star in A. of the first magnitude, but at least 2 new stars temporarily outshone it. The variable star Eta Carinae in 1843 was brighter than Canopus. It has a rapid decline in luminosity, and it now appears stationary with a magnitude of 7.5. The constellation is named after the ship *Argo*, which conveyed Jason and his companions to Colchis, the story of which is told in the article ARGONAUTS. The Hindus regarded it as the ship of the sun, while the Egyptians regarded it as the bark of the moon. The name by which this constellation was sometimes known in Europe until about 3 centuries ago was the Ark, a name which may be traced to the tradition in anct. Egypt that the gods Osiris and Isis surveyed the deluge from this stellar ship.

**Argol**, the crude product deposited on the bottom of a cask during alcoholic fermentation. It is used for the preparation of 'cream of tartar' and tartaric acid. The A. is partially purified by recrystallisation from hot water, is dissolved in water and boiled with chalk, when calcium tartrate,  $\text{CaC}_2\text{H}_3\text{O}_6$ , is precipitated. After washing, the tartrate is treated with sulphuric acid, which sets free the tartaric acid. A. is also a Mongolian term for dried dung used as a fuel.

**Argolis**, see ARGOS.

**Argon** (Gk. *ἀργός*, inactive), a gaseous constituent of the atmosphere. Symbol A, atomic number 18, atomic weight 39.94. Up to 1894 it was generally assumed that the atmosphere contained oxygen and nitrogen, with variable quantities of carbon dioxide, hydrogen, water-vapour, ammonia, etc. It is true that Cavendish had in 1785 suggested the existence of a small proportion of another constituent, but little notice was taken of the suggestion until Lord Rayleigh and Sir William Ramsay demonstrated the existence of A. in 1894. Cavendish had added excess of oxygen to air and passed electric sparks through the mixture collected over caustic potash, so that nitrous acid was produced and absorbed. He then absorbed the excess of oxygen with 'liver of sulphur,' and found a small bubble of unabsorbable gas remaining. Over 100 years later Lord Rayleigh

determined with great care the weight of 1 litre of oxygen, of hydrogen, and of nitrogen. The results obtained in connection with atmospheric nitrogen were consistent one with the other, but when nitrogen prepared from ammonia was used, an unexplainable error of about one-half per cent was encountered. In 1894, Rayleigh and Ramsay in association proved that the difference was due to the presence in the atmosphere of an inert gas heavier than nitrogen.

A. may be prepared from atmospheric nitrogen in 3 ways: (1) by passing it over red-hot turnings of magnesium; (2) by sparking the gas with excess of oxygen in the presence of caustic alkali; or (3) by dissolving the more soluble A. in water. Commercially, it is obtained by the practical distillation of liquid air.

As its name implies, A. is an inactive gas, and all attempts to obtain combination with other elements have failed. Its density ( $H = 1$ ) is 19.82. It has been condensed to a colourless liquid which boils at  $-187^\circ$  and freezes at  $-189.6^\circ$ . It is largely employed in filling gas-filled electric filament lamps.

**Argonautidae**, a family of cephalopodous molluscs of the order Dibranchiata and div. Octopoda. They are cuttle-fish, the males of which are very small, and the females, which are much longer, bear a thin shell to hold their eggs. *Argonauta argo*, the paper-nautilus, or paper-sailor, is found in the Mediterranean; *A. tuberculata* in the Indian Ocean.

**Argonauts** (Gk. *Ἀργοναῖται*, sailors of the *Argo*), the Gk. heroes who accompanied Jason in his quest of the Golden Fleece. Æson, king of Ioloe in Thessaly, was deprived of his kingdom by his half-brother Pelias. His son Jason, when he grew up, demanded the throne, which Pelias promised to surrender if Jason would bring the Golden Fleece from Colchis, where it was guarded night and day by a dragon, in the oak grove of Ares. Jason ordered Argus to provide him with a ship with 50 oars, the building of which was superintended by Athena. This ship was called *Argo*, after its maker. Jason embarked with the great heroes of the age, such as Castor and Pollux, Hercules, Theseus, and Orpheus. Æsculapius was their physician, Tiphys the pilot. Their number is variously given as 45, 50, and 54.

The A. landed first at Lemnos, an is. inhabited by women who had murdered their husbands. There they remained 2 years, and raised a new race of men called Minyæ. They next visited Samothrace and Bœotia, whence they were driven by a storm to Salmydessus, where they delivered the land from the persecution of the Harpies.

After many adventures, both by land and sea, they came to Æa, the cap. of Colchis. The king, Æëtes, promised to give up the Golden Fleece if Jason would yoke 2 fire-breathing bulls with brazen feet to a plough



and sow the teeth of the dragon which Cadmus had not used at Thebes. This Jason accomplished through the help of Medea, the king's daughter, who loved him. She provided him with the means of resisting fire and steel, and gave him a drug which lulled to sleep the dragon that guarded the Golden Fleece. The A. fled with their spoil, taking Medea with them, and were pursued by Æetes. In order to hinder her father in his pursuit, Medea seized her brother Absyrtus and strewed the way with his mangled limbs. Zeus, angry at the murder of Absyrtus, raised a storm which drove the *Argo* to the is. of Circe, who refused to absolve Jason.

The A. continued their journey and were guarded through the straits of Charybdis and Scylla by Tethys, the mistress of Peleus, one of their company. They sailed safely past the Sirens, who sang in vain, for Orpheus surpassed them. At the is. of the Phæacians they encountered King Æetes and his fleet. The wife of Alcinoüs, king of the country, was chosen to arbitrate between the Colchians and the A. Secretly by night she had a marriage consummated between Jason and Medea, and, in the morning declared that Æetes' claim to his daughter was void.

After many disasters the *Argo* arrived in the Peloponnesus, where Jason was purified of the murder of Absyrtus, and finally reached Thessaly in safety.

There are many versions of this story. Some scholars regard the quest of the Golden Fleece as a sun myth, while others compare it with the quest of the Holy Grail. The story probably developed from local traditions concerning the early Mediterranean seafarers and merchants.

**Argonne**, a forest and hilly dist. of France in the auct. provs. of Lorraine and Champagne. It is included in the depts. of Meuse, Marne, and Ardennes. Its chief tns. are Ste. Menchould (the auct. cap.), Clermont, Varennes, Beaumont, and Grandpré.

During the First World War, the A. was the scene of bitter fighting against the forces under the crown prince of Germany, whose advance in Sept. 1914 was finally stopped by Gen. Sarraill. In July 1915 the crown prince unexpectedly advanced his lines a quarter of a mile against superior odds, and thereby enhanced the fears of the Allies that through shell shortage they might be unable to resist the great Ger. drive of the summer of 1915. But the Fr. arrested his further advance. Therefore things came to a stalemate on this sector of the front; but the Gers. did not remain idle. The Argonne is a maze of forests, streams, gullies, and ravines. The Gers. took full advantage of this, not only constructing their Kriemhilde system of trenches as a continuation of the famous Hindenburg line, but, profiting by the terrain, built cement 'pill-boxes' for machine-guns over the entire section of the Argonne which they held. This stalemate was finally broken in the autumn of

1918, when Marshal Foch yielded to the insistence of Gen. John J. Pershing, commander-in-chief of the Amer. troops, that the Amer. soldiers should be given a large share in the fighting. The battle, which lasted for weeks, will be for ever memorable in Amer. annals, because more Amer. troops were engaged in it than ever fought under the Stars and Stripes at one time in any of the nation's wars. Twenty-two Amer. divs. were engaged, with a total strength of over 625,000 men. Gen. Pershing had 660 Amer. and 180 Fr. aeroplanes. The total strength of the Amer. and Fr. guns at his disposal was well over 2500. The importance of this battle was that it was calculated to bring the strongest pressure to bear upon the Gers. at this point at the moment when Gen. Haig was hammering away successfully at the Hindenburg line. If the Amers. and the Fr. troops, who were also engaged in this action, should succeed in piercing the Argonne, they would threaten one of the most important series of railway lines upon which the Ger. armies depended not only for supplies and reinforcements, but also for withdrawal in case of defeat.

The objective set the Amers. was to pierce the Forest of Argonne and advance up the W. bank of the Meuse, at the same time that the Fr., under Gouraud, advanced W. of the Argonne. The thrust was so dangerous that, hard-pressed as Ludendorff was all along the line, he had to throw in troops sorely needed elsewhere. He had one great advantage in that the Gers. were on the defensive behind extensive works. He could therefore defend with far fewer troops than his enemies needed for the attack. The Amer. attack opened with great *clan* on Sept. 26, on a front of 18 m., and, by the second day, Montfaucon, dominating a great stretch of country, had been taken. The booty was 100 guns and 8000 prisoners. Owing to the fact that the Amers. had few light railways in their sector and that their motor service of supply was hampered by bad roads, their advance was slowed down and part of the front line ran short of both ammunition and food. But by Oct. 4 these defects had been largely remedied, and the advance was once more resumed through what the Gers. considered to be an impregnable forest. By Oct. 14 the Amers. had captured Romagne, had broken through the Kriemhilde line at various places, and were approaching the partially completed Freya line. Gen. Pershing now divided his forces into 2 armies, the First under Gen. Liggett and the Second under Gen. Bullard (q.v.). In each of these there were Fr. as well as Amer. corps. By Nov. 2 the whole of the Argonne was cleared, the troops had passed through the Freya line and had reached Bazancay. According to the plan agreed upon between Marshal Foch and Gen. Pershing the troops were to push on to Sedan and cut the important railway network. By Nov. 6 Fr. and Amer. troops had reached the suburbs of Sedan, the town itself being full of

retreating Ger. soldiers. Just as in the war of 1870 the Gers. had trapped an entire Fr. army there, so now it seemed as if the Fr. and Amers. would turn the tables on the Gers. The latter, indeed, were only saved by the Armistice of Nov. 11. The Amer. casualties in this long-fought battle were 118,529, of which number 15,599 were killed. In all, the combined Amer. and Fr. armies captured nearly 18,000 men and 468 guns.

**Argos**, anct. city of Peloponnesus. In the Homeric age it was overshadowed by Mycenæ, but during the reign of Pheldon (770-730 B.C.) its supremacy extended over the whole of the E. Peloponnesus. Engaged in frequent wars with Sparta; 461 B.C., alliance with Athens; 229 B.C., governed by tyrants supported by Macedon; 146 B.C., subjugated by Rome; A.D. 1210, captured by the Franks. During the eighteenth century the scene of many conflicts between the Venetians and Turks.

Archæological excavations have brought to light the Heræum, or temple of Hera, and many interesting pieces of sculpture, etc.

**Argos**, in Amphilochia, was a tn. near the gulf of Arta. The ruins at the bottom of the gulf of Karavasara are supposed to be those of A.

**Argosy**, a large ship either for merchandise or war. According to Rycout in *Maxims of Turkish Policy*, chap. xiv., it derived its name from Ragoes, i.e. the ships of Ragusa, but it is more probable that the A. derived its name from the ship *Argo* (q.v.).

**Argostoli**, cap. of Cephalonia, one of the Ionian Is. Pop. 8000. See of the Gk. Church. The tn. has a fine quay and harbour. There is a curious stream flowing from the sea, which is used to drive mills. The chief industries are shipbuilding and silk-spinning. The ruins of Crædili still remain.

**Argot**, see SLANG.

**Arguin**, a small Fr. is. off Cape Blanco, Africa. A. Bank is very dangerous for ships, and was the scene of the wreck of the *Medusa*, 1816.

**Argument**, literally that which is evident or manifest, from Lat. *arguere*, to make clear. (1) Proof, chain of reasoning which is given in support of a proposition. (2) Synopsis, contents of a book, outline of a poem or play. (3) In logic, the middle term in a syllogism. (4) In mathematics, the angle, arc, or other quantity upon which the required quantities are made to depend. (5) In astronomy, the angular distance on the epicycle of a planet from the true apogee of the epicycle.

**Argun**, riv. of Asia. Rises in Great Kinning Mts., W. Manchuria, and flows N.W., forming the boundary between Russian and Chinese ter. and joining the Shilka to form the Amur. Length 440 m.

**Argus**, of Gk. mythology, son of Arestor, surnamed Pandotes, All-seeing, because he had 100 eyes, of which only 2 were asleep at one time. Appointed by Hera to be guardian of Io, whom Zeus had changed into a cow. Zeus commanded Hermes to lull him to sleep with his flute

and then to kill him. Hera transplanted his eyes to the tail of the peacock.

**Argus Pheasant**, the *Argus giganteus*, a galliform bird of the order Neornithes, so called because its long tail-feathers bear ocellated spots. It is a native of the Malay Peninsula and Sumatra.

**Argyll, Dukes of**. The dukes of A. are descended from the Campbells of Lochaw, who were created barons with the title of Baron Campbell. The earldom was created in 1457 by James I., who conferred it on Lord Campbell (d. 1493), from whom the greatness of the family dates. The second earl was killed at Flodden, the third earl d. in 1530, whilst the fourth earl was the first of the great Scottish nobility to become Protestant. The fifth earl was one of the 'lords of the congregation,' but is later found on the side of Mary Queen of Scots, whose troops he commanded at the battle of Langside. After her defeat he again became friendly with the regent Murray, and ultimately became lord high chancellor of Scotland. He d. in 1573. He was succeeded by his half-brother, who d. in 1584, and his successor spent the greater part of his time in fighting for Philip III.

**Archibald Campbell**, eighth earl and first marquess, was b. in 1598 and succeeded to the control of the estates at an early age. He was thoroughly despotic and was described as the most powerful subject in the kingdom, being at the head of 20,000 retainers. He boldly opposed the church policy of the king (Charles I.) in Scotland. He became exceedingly powerful and in 1640 the king was practically forced to create him a marquess. An attempt was made to kidnap him with 2 other Scottish leaders—the 'Incident' in 1641. He was instrumental in the completion of the alliance between the Parliament and the Scots in 1643. He defeated several royalist risings in Scotland; fought a campaign against Montrose in Argyllshire. He was defeated by Montrose at Inverlochy and also witnessed the victory at Kilsyth. He negotiated with the king after the surrender at Newark and attempted to moderate the parl. terms. He lost power when the king was beheaded, and although he supported Charles II. in his attempt to regain the crown, his power passed to the Hamilton family. For complicity in parl. plots he was executed in 1661.

**Archibald Campbell**, ninth earl and second marquess of A., eldest son of the eighth earl and first marquess of A., fought at Dunbar on the royalist side. Was omitted from the Act of Grace of 1654, and, although he submitted, was a prisoner from 1657 to 1660. He was raised to favour and high position by Charles II. He refused to sign the new test in 1680, making a special reservation, and was tried for treason and condemned to death 1681. He escaped to Holland, and there agreed to the Monmouth plot, and, crossing to Scotland, tried to raise the Campbells. He failed, and he was captured and beheaded on the old charge of treason 1685.

**Archibald Campbell**, first duke, d. 1703,

was an active promoter of the Revolution of 1688. He was deputed to tender the crown of Scotland to William III. in 1689. Organised the massacre of Glencoe, 1692. In 1701 he was created first duke.

**John Campbell, second duke**, one of the great founders of the union. His services in this respect were recognised by the bestowal of the title of earl of Greenwich. He was a famous soldier, and fought at Oudenarde. Later in the war he took command in Spain. He was deprived of his offices on his return for his outspoken criticism of the ministry. Restored to favour under George I., he was instrumental in putting down the '15 with so little bloodshed. He was an outspoken and brilliant orator, but his oratory brought him often into disgrace. He continued his public life until 1740, when he resigned his appointments and retired into private life. He *d.* in 1743.

**George John Douglas Campbell, eighth duke**, *b.* in 1823, succeeded his father in 1847. He rapidly became a well-known Liberal politician. He was lord privy seal, 1852; postmaster-general, 1855; secretary of state for India, 1868, and during his period of office did much to bring on the second Afghan war. In 1871 his son married the Princess Louise, fourth daughter of Queen Victoria. He resigned office (lord privy seal) in 1881 on the question of an Irish Land Bill. He was also an opponent of Irish Home Rule. He *d.* in 1900. Amongst the books that he wrote are *The Reign of Law*, *Primer of Man*, *The Unity of Nature*.

**John Douglas Sutherland Campbell, ninth duke**, succeeded his father 1900. He married in 1871 H.R.H. the Princess Louise. He was governor-general of Canada 1878-83. Represented S. Manchester from 1895 to 1900 as a Unionist. Is known also as a writer of both prose and poetry. He *d.* in 1914.

**Argyll and Sutherland Highlanders (Princess Louise's)**. This regiment, which combines the former 91st (Argyll) and 93rd (Sutherland) Foot, raised respectively in 1794 and 1799, was augmented to 27 battalions in the First World War. Its death-roll in the war was 6442. In the heavy fighting round Zonnebecke and Ypres in 1914 the regiment suffered tragic losses near Fromelles (2nd Batt.). It was also conspicuous in the Ypres battles of 1915 (7th Batt.) and at Loos (2nd Batt.). The 1st Batt. was at Salonika in 1916 and in that year the 2nd, 6th, 8th, 10th and 11th Batts. were all engaged in severe fighting in the Somme battles, notably at Martinpuich and Delville Wood; at Arras in 1917 the 11th Batt. suffered losses, and other batts. were distinguished for their fine resistance at the Rouix Chemical Works near the Menin Road (May 1917) and especially in the Vaux-Vraumont sector in 1918 (14th Batt.). Their battle honours before the First World War included the Cape of Good Hope (1806), sev. battles of the Peninsular war, S. Africa (1846-47, 1851-53), the Crimea, Indian Mutiny, S. Africa (1879) and the Modder River and Paardeberg.

E.E. I

In 1930 H.R.H. Princess Louise became colonel-in-chief of the allied A. & S. H. of Canada. In the Second World War the regiment fought in the Libyan battles, and against the Gers. in Greece. Units of the regiment bore the brunt of some of the heaviest fighting in the Malayan peninsula (1941-42). They entered this battlefield over 800 strong; but after fighting a rearguard action down the entire peninsula they crossed over to Singapore Is. with fewer than 100 men, and these were the last to cross the causeway from Johore to Singapore.

**Argyllshire**, a maritime co. in W. of Scotland. The land is cut up into many peninsulas and is., and there are numerous lochs and inland bays. The greatest length is 115 m., and the greatest breadth 55 m. The coastline measures 2289 m., no part of the co. being more than 12 m. from the sea or from a large inland loch. Area 3213 sq. m., of which 623 belong to the is. The country is rugged and mountainous, and contains some of the most picturesque scenery in Scotland.

Climate, rainy and bleak. Winds S.W. and S.E. Average rainfall at Oban per annum 64.18 in. Average rainfall at Upper Glencoe per annum 127.65 in. The average yearly temp. is 48° F. The co. is divided into dists., viz. Cantire, N. and S. Argyll, Lorne, Appin, Cowall, Morven, and Sunart. There are numerous is., of which may be mentioned Mull,Islay, Jura, Tyree, Coll, Colonsay, Jona, and Staffa. The highest peaks are Bidean nam Bian, 3766 ft., and Ben Cruachan, 3689 ft. The prin. lochs are Moidart, Sunart, Linnhe, Fyne, and Long, and the freshwater lochs Awe and Lydoch. Loch Awe is famous for its salmon and Loch Fyne for herrings. There are no navigable rivs. The Awe and Orchy are short, rapid streams. There are many beautiful glens, e.g. Glen Aray, Strae, Croe, Glencoe (famous for the massacre in 1692), and Glen Lochy (the 'wearisome glen'). The co. is a favourite of sportsmen, there being plenty of deer and game. The land belongs principally to the Duke of Argyll and the Earl of Breadalbane. The chief industry is sheep- and cattle-rearing. Woollens for home use are made near Inveraray. Gunpowder is manufactured at Melford and Furnace, whisky at Campbelltown and Oban. Fishing is an important industry. Easdale and Ballachulish quarries supply excellent roofing slates. Some coal is found near Campbelltown; lead at Strontian, and in Islay and Coll; granite near Inveraray. Other minerals are copper, marble, and limestone. A branch of the L.M.S. railway runs from Tyndrum to Oban. The former W. Highland railway from Glasgow to Fort William was opened up in 1894. Frequent steamers run from Glasgow. The Crinan Canal was built 1793-1801. The co. returns 1 member to Parliament. Pop., which had been decreasing for a century, owing to emigration, principally to Canada, was 70,902 in 1911, but in 1921 it was 76,862, but probably this number included many tourists and visitors to Oban. In 1931 it had dropped to 63,000

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**Argyrokaastro**, a tn. in Albania, situated in the valley of the Deropul, a branch of the Viosa. It contains a castle, a mosque, and barracks. Taken by Ali Pasha in 1812, it was afterwards surrendered to the Turks. Pop. 11,733. The scene of heavy fighting between the Its. and Gks. in 1941. (See WAR, SECOND WORLD, *Fall of Greece*.)

**Argyropoulos, Joannes** (1416-86), a Gk. scholar, one of the early promoters of the revival of learning, b. at Constantinople; 1434, rector of the univ. of Padua; 1456, prof. of Gk. in the univ. of Florence. Trans. Aristotle.

**Ari, Thorgrilsson** (1067-1148), historian of Iceland, surnamed Frodi, or the Wise. One of the first to commit the Norse sagas to writing. He began the *Landnamabók*, a hist. of the settlement of Iceland, continued by later writers; and wrote the *Konungabók*, a hist. of Norway; the *Islandingabók*, an account of the Icelandic laws; and the *Kristni Saga*, an account of the conversion of Iceland to Christianity.

**Aria**, literally 'air,' denoted a rhythmic, as contradistinguished from a recitative, song, but later implied a vocal piece in three sections, of which the third repeats the first, while the second introduces variety of subject matter, key, and mood. The development of the A. is closely bound up with that of the It. school of music, as the great medium of vocal display. In principle it existed as early as Monteverdi's *Arianna* (1608) and reaches its more elaborate form in Alessandro Scarlatti and Handel. As a definite form the A. is now defunct and composers no longer employ the formal three-section plan. For a full discussion consult Percy A. Scholes, *Oxford Companion to Music*, 1941.

**Aria** was one of the E. provs. of the anct. Persian empire, forming a part of Ariana. It was bounded on the N. by Margiana and Bactriana, on the E. by the Paropamisadae, on the S. by Carmania, and on the W. by Parthia. It was the site of the modern Seistan and the S. part of Khorasan. It is described by Strabo (xl. 10). He says it is watered by the Ra. Arios and Margos, and the Margos is supposed to be the modern Murghab. According to Herodotus, iii. 93, the Parthi, Chorasmii, Sogdi, and Arii formed the sixteenth satrapy into which Darius divided the Persian empire; and in vii. 62 he says that Arii was the anct. name of the Medi. Alexandria Arion in A. was founded by Alexander the Great, and is supposed by some to be the present Herat.

**Ariadne**, daughter of Minos II. of Crete by Pasiphaë, fell in love with Theseus, to whom she gave a thread by which he extricated himself from the labyrinth and escaped from the Minotaur. He accordingly married her, but deserted her in the is. of Naxos. There she was found by Dionysus, who placed among the stars the crown he gave her at their marriage.

**Ariana**, the general name given to the E. provs. of the anct. Persian empire, stretching from Media to the Indus, and bounded on the N. by the Indian

Caucasus and on the S. by the Arabian Sea.

**Ariano**, episcopal see, belonging to Campania, Italy. An anct. Samnite tn. formerly called Aequum Tuticum. Pop. 9399. Frequently devastated by earthquakes.

**Arians**, see ARIUS.

**Ariarathes**, the name of sev. kings of Cappadocia: (1) Son of Ariamnes I., defeated and slain by Perdiccas 322 B.C. (2) Son of Holophernes, and nephew of A. I., became king 315 B.C. (3) Son of Ariamnes II., and grandson of No. 2, died 220 B.C. (4) Son of No. 3, reigned 220-162 B.C., and assisted Antiochus the Great against the Roms., and obtained peace in 188. (5) Son of No. 4, surnamed Philopator, reigned 163-130 B.C. He was expelled by Demetrius Soter, but was restored by the Roms., whom he helped against Aristonicus of Pergamus. (6) Son of No. 5, reigned 130-96 B.C., and was put to death by Mithridates. (7) Son of No. 6, also murdered by Mithridates, who then reigned. (8) Second son of No. 6, was deposed by Mithridates. (9) Son of Ariarathes II., reigned 42-36 B.C., and was deposed and put to death by Antony.

**Arias, Montanus** (1527-98), Sp. orientalist, b. at Fregenal de la Sierra, in Extremadura. Studied at the univs. of Seville and Alcalá and took orders in 1559; 1562, consulting theologian to the Council of Trent; 1571 pub. a commentary on the minor prophets; 1568-73, ed. the Polyglot Bible at Antwerp; 1575-1576, tried at Rome of a charge of heresy, and acquitted.

**Aribert, or Heribert**, of Lombardy, archbishop of Milan, 1018-45. He was one of the leaders of the Ghibelline party, and in 1026 crowned the Emperor Conrad II., whom he had invited to Italy, as king of Milan.

**Arica**, seaport tn. of prov. connected with the prov. of Tacna, N. Chile, about 40 m. S. of Tacna by rail. It is the prin. port for Bolivia, and exports copper, guano, silver, salt, etc. The tn. was the subject of the long dispute between Chile and Peru, which led to mediation by the U.S.A. The settlement, accepted by both countries in May 1929, awarded A. to Chile in return for payment to Peru of a sum of \$1,200,000, and Tacna to Peru. The prosperity of the tn. has been diminished by frequent earthquakes, of which the chief occurred in 1868. Pop., once 30,000, now about 13,000.

**Arichtat**, seaport of Nova Scotia, Richmond co., on Isle Madame. It is the seat of a Rom. Catholic bishop and possesses a good harbour, from which there is some fishing. Pop. of the dist., 3000.

**Aricia**, an anct. tn. of Latium, on the Applan Way, 16 m. from Rome. In 338 B.C. it was subdued by the Roms., and received the Rom. franchise. In its neighbourhood was the celebrated grove and temple of Diana Aricina, on the borders of the Lacus Nemorensis. Her priest, called *Rex Nemorensis*, was always a runaway slave. In order to become her priest he had to slay the existing holder of the office in single combat. The Chigi

Palace was much damaged by bombs in the Second World War.

**Aricina**, see **ARICIA**.

**Aricine**, see **CINCHOVATINE**.

**Arideus**, see **ARRHIDAUS**.

**Ariège**, a dept. in the S. of France, bounded on the S. by Catalonia and Andorra, W. by Haute-Garonne, N.E. by Aude, and S.E. by Pyrénées-Orientales. The E. part is watered by the A., the W. by the Salat. Both rivs. later join the Garonne. Offshoots of the Pyrenees, which lie on the S., cover a large part of the dept. The chief industries are agriculture and vine-growing, iron-mining, and woollen manufacturing. Cap., Foix; area, 1890 sq. m.; pop. 145,956.

**Ariel**, a word signifying lion of God or altar of God, is in Isa. xxix. 1 applied to Jerusalem. In later Jewish times the name is given to a water spirit. One of the fallen spirits in *Paradise Lost* bears this name. See also Pope's *Rape of the Lock* and Shakespeare's *Tempest*. In astronomy, one of the satellites (the inmost) of Uranus.

**Aries**, or the **Ram**, is the first of the anct. zodiacal signs. The Gk. mythology makes A. to be the commemoration of the Golden Fleece, in quest of which the Argonautic expedition was undertaken.

**Arietta** (the diminutive of the lt. word *aria*), in music, a short air.

**Arikara**, a Caddoan tribe of N. Amer. Indians, formerly belonging to the Pawnees. They originally lived on the Missouri, but were driven out of their own dist. by the Sioux, and were later with the Mandans and Grosventres on the Fort Berthold reservation in N. Dakota. They now number a few hundreds. See Dorsey's *Traditions of the Arikara*, 1904.

**Arilus**, or **Aril**, in some plants forms an exterior appendage to the seed. It develops after fertilisation, proceeding from the placenta, and partially invests the seed, after which it falls spontaneously. The mace of the nutmeg and the scarlet covering of the seeds of the climbing bitter-sweet are true arils.

**Arimanes** and **Areimanias** are Gk. corruptions of the Persian name *Ahriman* or *Aberiman*. See **AHRIMAN**.

**Arimaspi**, a mythological people of Scythia, inhabiting the E. coast of the Caspian Sea. According to the fable, they had but one eye, and were engaged in perpetual warfare with the griffins for the gold rolled down by the R. Arimaspius.

**Arimi** and **Arima**, the names of a mythical people, dist., and range of mts. in Asia Minor. In the W. countries the A. were considered as monkeys, which fact caused them to be confounded with the Cercopes whom Jupiter had turned into monkeys. Amongst the old Gk. poets they were a mythical people, and Arima was the scene of the punishment of the monster Typhoeus.

**Arimos**, a riv. in Brazil, joining the Tapajós, a trib. of the Amazon.

**Ariobarzanes**: I. The name of kings of Cappadocia: (1) Surnamed Philoromæus, reigned 93-63 B.C., being elected king by the Romans. During his reign he was several times expelled, but was finally restored

by Pompey shortly before his death. (2) Surnamed Philopator, became king after his father, 63 B.C., but was assassinated in 51. (3) Surnamed Eusebes and Philoromæus, succeeded his father in 51 B.C., and reigned until 42, when he was slain by Cassius. II. The name of kings or satraps of Pontus: (1) Who reigned c. 400 B.C. (2) Son of Mithridates I., reigned 363-337 B.C. He revolted against Artaxerxes in 362. (3) Son of Mithridates III., reigned 266-240 B.C.

**Arion** (c. 625 B.C.), Gk. lute-player and poet, a native of Lesbos. He gave the dithyramb its artistic form. Herodotus tells us that returning to Corinth by sea with much treasure the sailors plotted his death. He pleaded permission to play his lute, and then, throwing himself into the sea, escaped on the back of a dolphin whom the melody had attracted.

**Arioso**, a vocal or instrumental piece of a recitative character, but of the more melodious kind. Also means the kind of melodic singing suitable for the greater arias. Mendelssohn sometimes uses the word for any short air in an opera or oratorio.

**Ariosti**, **Autilio** (c. 1660-1740), It. musician and composer, b. at Bologna. He produced operas at Venice and Berlin, and finally in London. Of some 25 works perhaps the best known are *Coriolano*, *Dafne*, and *Erfille*.

**Ariosto**, **Ludovico** (1474-1533), described by Hallam as having been, 'after Homer, the favourite poet of Europe,' was b. at Reggio. For some years he studied law in compliance with his father's will, but his bent from the first was towards literature. His father d. early, and he then devoted much time to the care of his younger brothers and sisters. He had already written 2 comedies and some good lyrics when, in 1503, he was taken into the household of the Cardinal Ippolito d'Este. His life was busy, for he was perpetually engaged in embassies to Rome and in diplomatic business. Yet he managed in the intervals of business to complete his great work, the *Orlando Furioso*, of which the first ed. in 40 cantos was pub. at Ferrara in 1516. In 1517 he quarrelled with the cardinal, and entered the service of the duke of Ferrara, Ippolito's brother. His situation was not greatly improved, and in 1521 he was appointed governor of the Garfagnana, where his energies were chiefly devoted to the suppression of bandits and the enforcement of order. He was recalled some years later, and in 1532 appeared the finally revised *Orlando*, in 46 cantos. The delight of the poem is in its harmonious, accurate intricacy, its interrupted climaxes, and surprising confluence of scattered incidents. The praises of Cardinal Ippolito and the duke of Ferrara are sung in the comically fulsome asides of the poem, while the cardinal's real meanness and mediocrity are immortalised in the *Epistles*. Next year he d. at Ferrara, where he was buried in the church of San Benedetto. Besides his great work, he wrote 5 plays, 7 satires after Horace, some Lat. poems, and a prose dialogue *Erbolate*, on the subject of

hygiene, *Rime* (sonnets, etc., and elegies), and a fragment, *Cinque Canti*. His distastes and weaknesses make him the eternal contemporary of Horace and Lamb, for whom, similarly, the stirring events of the times in which they lived were not much more than additional perturbations in the never sufficiently calm tenor of their private life.

The subject of the *Orlando* had already been treated by Pulci in his *Morganle Maggiore*, and by Boiardo in his *Orlando Innamorato*, and of this latter work the *Orlando Furioso* is professedly a continuation. It is the triumph of the half-satiric, fantastic, yet lovely style which Boiardo had hardly attained. What raises A. to the level of the greatest poets is the sustained zest of his execution upon the huge scale he chose for representing his own private world. In A., Croce sees the model It. artist, just as in Cavour he sees the model It. politician. The first complete ed. of *Orlando Furioso* was that pub. in Ferrara in 1532. The ed. of Morali (1818) follows the text of the 1532 ed. with great correctness. A good modern ed. is that by Papini, pub. in Florence, 1903. The indifferent translations into Eng. of Sir John Harrington, 1591, and Hoole, 1783, were superseded in 1823 by the spirited rendering of Stewart Rose. See also J. S. Nicholson, *Life and Genius of Ariosto*, 1914; Benedetto Croce, *Ariosto, Shakespeare, and Corneille* (Eng. translation 1920).

**Ariovistus** (first century B.C.), chief of the Ger. tribe of the Suevi. The Sequani, a Gallic tribe, being engaged in a conflict with the Æduli, asked his help. He defeated the Æduli, but settled in the land of the Suevi. The 2 Gallic tribes now demanded assistance from Rome. In 58 B.C. Cæsar entirely defeated the Gers. at Vesontium (now Besançon).

**Arish** or **El Arish**, is a small tn. on a night eminence about half a m. from the Mediterranean shore, on the road from Egypt to Syria. It contains Rom. remains and sev. marble columns, and is the site of the anct. Rhinocolura. It was taken by the Fr. 1779, in whose possession it remained for some time. At A. Sir Sidney Smith concluded a convention with the Fr. army, which was afterwards disavowed by the Brit. Gov.

**Aristænetus**, a Gk. writer of Nicæa who lost his life in the earthquake at Nicomedia A.D. 358. To him are attributed fifty *Erotic Epistles*, which, if less entertaining than those of Alciphron, are among the best-known collections of fictitious letters of Gk. sophists. There is a Ger. translation by Herel, Altenburg, 1778, and sev. Fr. translations.

**Aristæus**, a Gk. divinity whose cult is found in anct. Thessaly, Bœotia, Arcadia, Thrace, etc. According to the general tradition, he was the son of Apollo and the nymph Cyrene, and was educated by Chiron, the centaur. At Thebes he married the daughter of Cadmus (Autonoë) and became the father of Actæon. He was worshipped as the protector of herdsmen and teacher of bee-keeping and the rearing of the olive tree.

**Aristagoras** (d. 497 B.C.), tyrant of Miletus, acted as regent for his brother, Histæus, while the latter was at the Persian court. An attack on Naxos having failed, he raised all Ionia in revolt against Persia, and having obtained aid from Athens, attacked and burnt Sardis. His troops were, however, driven to the coast by the Persians, and he retired to die in Thrace.

**Aristarchus**, the name given to a crater in the N.E. quadrant of the moon. It is the brightest object on the moon and is visible as a luminous spot when all the surrounding region is involved in shadow.

**Aristarchus of Samos** (c. 250 B.C.), a Gk. astronomer, all of whose works are lost except a short treatise *On the Magnitudes and Distances of the Sun and Moon*. He is said to have taught that the earth moves round the sun.

**Aristarchus of Samothrace** (c. 220-144 B.C.), Gk. grammarian and critic. He early settled at Alexandria, where he studied under Aristophanes of Byzantium, whom he later succeeded as keeper of the Alexandrian library. Meanwhile, he was made tutor to the children of Ptolemy Philometor. It is said that in his old age he was persecuted by his former pupil, then ruling Egypt as Ptolemy Physcon, so that he retired to Cyprus and d. there at the age of 72, his death being hastened by voluntary starvation invited by an incurable dropsy. He estab. a school of philologists who long flourished at Alexandria and Rome under the name of Aristarchæans. He himself was wholly engaged in criticism and exegesis, being said to have written over 800 commentaries. He gave his attention chiefly to the poets, and above all to the Homeric poems. His ed. of these latter is the foundation of the present recension. He gave much labour to the purification of the text, removing all interpolations and spurious readings. We are enabled to judge of his comments by fragments which have been preserved in the Venetian scholia to the *Iliad*. See Lehr's *De Aristarchi Studii Homerici*, third ed. 1882, and Ludwig's *Aristarchi Homerische Textkritik*, 1885.

**Aristæus**, reputed to have been sent by Ptolemy Philadelphus, king of Egypt, to the high priest Eleazar to obtain people to translate the O.T. into Gk. A. is said to have gathered together 72 Jewish translators, who assembled on an is. to carry out the task, which, when finished, was called the Septuagint, i.e. the version of the Seventy. This story is related in the Epistle of A., of which there is much uncertainty as to the date. The epistle, however, is now considered to be spurious. See under SEPTUAGINT.

**Aristias** (c. 1798-1884) was a Gk. poet who lived in Wallachia. He is celebrated for his translation of the *Iliad* into Rumanian verse, and he took an active part in the political movements for the independence of Greece.

**Aristides** (c. 530-468 B.C.), surnamed the Just, an Athenian statesman. He was the son of Lysimachus, and came of an

aristocratic family. He was one of the 10 leaders at Marathon (490 B.C.), and persuaded his fellow leaders to alter the arrangement that each should lead for 1 day, and to give Miltiades full power. In the next year he was made chief archon, and his zeal for the conservative policy brought him into conflict with Themistocles, the democrat, by whose influence A. was ostracised c. 484 B.C. In 480 came the invasion of Xerxes, king of Persia, and Themistocles, eager to stop all dissension, secured the passing of a decree recalling all post-Marathonian exiles. A. profited by this, and did good service at Salamis. In 479 he was elected strategus, and shared with the Spartan Pausanias the glory of the victory at Plataea. He later took the lead in the formation of the Delian league. He died poor, and his family were compelled to receive pensions from the State.

**Aristides, Aelius**, surnamed Theodorus, Gk. sophist and rhetorician. He was the son of Eudæmon, and studied under Polemon of Smyrna and Herodes Atticus. After many travels, he settled at Smyrna. Prior to this he had been troubled by illness for 13 years, but this did not hinder him from the pursuit of his studies. In 178, when Smyrna had been destroyed by an earthquake, he secured from the Emperor Marcus Aurelius its rebuilding at the imperial expense. Fifty-five of his speeches are extant, as also certain other work. His 6 *Sacred Speeches* are worthy of note. Prin. ed. Dindorf, 3 vols. 1829.

**Aristides, Quintilianus**, a Gk. grammarian who lived probably in the third century A.D. He is the author of a treatise on music, one of the most important of antiquity. It was first edited by Meibomius.

**Aristides of Thebes** was a painter and contemporary of Apelles. According to Pliny, he was the first to try to give expression to his characters. His best-known picture was one of a child approaching its mother, who lay wounded and dying in the midst of a sacked city.

**Aristion**, see **ATHENION**.

**Aristippus** (fl. fourth century B.C.), founder of the Cyrenaic or Hedonist school, was b. at Cyrene. He was a pupil of Socrates, whose philosophy he partially adopted, making pleasure the final aim of life. He lived, therefore, the life of a philosophic voluptuary, while at the same time retaining restraint over his passions. He passed much of his life at Syracuse at the court of Dionysius, and lived some time at Corinth in intimacy with the famous courtesan, Lais. His doctrines were taught after his death by his daughter Arete, and later by her son, Aristippus the younger.

**Aristobulus of Cassandrea** (fourth century B.C.), a Gk. historian who accompanied Alexander the Great on his campaigns, and later wrote an account of them. Arrian made considerable use of his works.

**Aristocracy**, theoretically a form of gov. administered by the best citizens (Gk. ἀριστος, best). In practice it means gov. by the nobility. See **GOVERNMENT**.

**Aristodemus** (eighth century B.C.), king of Messenia, who waged a 20 years' war for independence against the Spartans. He committed suicide in despair of final success, on the receipt of unfavourable oracles.

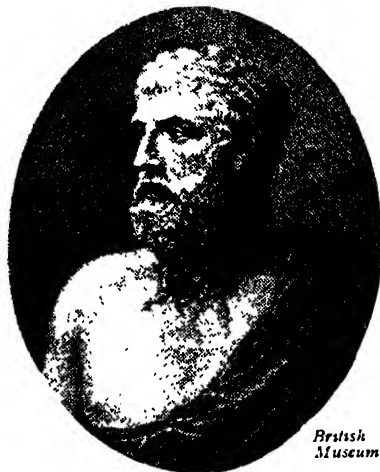
**Aristogiton**, a noble Athenian who lived in the beginning of the sixth century B.C. He together with Harmodius plotted the death of the tyrant Hippas and his brother Hipparchus. Hipparchus was murdered at the Panathenaic festival, 514 B.C. Harmodius was immediately killed. A. escaped but was afterwards taken and put to death by Hippas. Four years afterwards Hippas was expelled, and Harmodius and A. were regarded as martyrs, bronze statues being erected to them in Athens. According to Thucydides and Herodotus (vi. 123), the plot arose out of a private quarrel, and was not undertaken in the cause of liberty.

**Aristolochia** is the name of a large genus of herbs or woody vines, the birthworts, as they are popularly called. They are characterised by pungent aromatic rootstocks and irregular flowers. They are cultivated chiefly for the flowers, these being curiously shaped, with peculiar markings. The European birthworts and related species were once famous for their reputed medicinal properties.

**Aristomenes** (seventh century B.C.), a Messenian general who led his countrymen in the second Messenian war. After a number of daring attempts and brilliant successes he was betrayed by Aristocrats of Arcadia, and fled to Rhodes, where he d.

**Aristophanes** (c. 450 – c. 385 B.C.), the most renowned of the Gk. comic dramatists, probably b. at Athens, where he spent his life. His education was of the best, and he favoured throughout the aristocratic and conservative party. His production began early, and altogether 54 comedies are ascribed to him, of which 11 only are extant. These comedies fall into 3 well-defined periods, the first extending from 427 to 421 B.C., the second to 405, the last to 388. His early plays show unrestrained political satire, the second period shows more restraint, and in the plays of the third period the satire is chiefly social. His extant plays of the first period are 5. *The Acharnians* (425) seeks to aid the peace party by drawing the contrast between Lamachus the warlike and Dicaeopolis, an honest countryman, who makes peace with Sparta on his own account, and on whom all blessings are showered. *The Knights* (424) is a vigorous attack on Cleon, who for a while beguiles the populace represented under the name of Demos. Demos is finally rescued and his youth restored. *The Clouds* (423) satirises the Sophists and especially Socrates, the proprietor of a 'thinking shop' where all dishonesty is taught. Alcibiades is represented under the name of Phidippides, the young Athenian. In *The Wasps* (422), A. ridicules the Athenian love of law-suits, and in *The Peace* (421) he continues the theme of the Acharnians, advocating once again a truce with Sparta. To the second

period belong 4 plays. In *The Birds* (414) 2 old Athenians leave the tn. and persuade the birds to build in mid-air the city of Cloud-Cuckoo-town. The gods are thus cut off from the sacrifice of men, and the sceptre is regained from Zeus. Some have seen in this play an allegory of the Sicilian expedition. *Lysistrata* (411) shows the women taking the affair into their own hands and making peace. *The Thesmophoriazuse* (411) contains an attack on the tragic poet Euripides. *The Frogs* (405) continues this literary satire. Dionysus is sent to Hades to fetch a poet, Æschylus and Euripides having just died.



Aristophanes  
Museum

ARISTOPHANES

These two contend for the throne of tragedy, which is finally won by Æschylus. In *The Ecclesiazuse* (392 or 389 B.C.) the dramatist ridicules the mania for communism, while *Plutus* (388) is merely a moral allegory. The works of A. are characterised by wit and hearty humour, by a perfect agreement of matter and form, and by exquisite lyric quality.

**Bibliography.**—Prin. eds. by Meineke (1860), Dindorf (1869), and Blaydes (1880-93). The introduction to Blaydes's ed. has a list of eds. and of translations in Eng. and other languages. Among the best general books are H. Müller-Strübing, *Aristophanes und die historische Kritik* (1873); E. Deschanel, *Études sur Aristophane* (3rd ed., 1892); A. Couat, *Aristophane et l'ancienne comédie attique* (1889); L. E. Lord, *Aristophanes, his Plays and his Influence* (1925). Among translations of various plays are those of J. H. Frore, T. Mitchell, H. Kennedy, B. Rogers, and G. Murray. *Aristophanes of Byzantium* (c. 260-300 A.D.), a famous Gk. grammarian, the pupil of Zenodotus. His pub. valuable

critical eds. of the Homeric poems, of Hesiod, and of the other chief Gk. poets. He also did valuable work as a lexicographer, and introduced critical signs, punctuation, etc. See Nanck's *Aristophanes Byzantii Fragmenta*, 1848.

**Aristotelia** is 'those things pertaining to Aristotle.' See ARISTOTLE.

**Aristotle** (384-322 B.C.), the Gk. philosopher, was b. at Stagira (hence the term 'the Stagirite' for the philosopher), a Gk. colony on the peninsula of Chalcidice, in the year 384 B.C. He came of a family which had long been given to the study of medicine, his father, Nicomachus, being the physician and friend of Amyntas, king of Macedonia. Though he never took up medicine as a profession, it seems probable that A.'s education included this study to a large extent. It is said that he practised medicine when he first came to Athens, and his later inclinations towards natural science may also be traced to his early training.

In his eighteenth year (367 B.C.), he came to Athens with the intention of studying philosophy under Plato. This great philosopher was, however, then absent in Syracuse, on the mission which so strangely connects him as adviser with Dionysius the elder and Dionysius the younger. A., therefore, occupied himself with his own studies until the return of Plato in 364 B.C., when he became his pupil, and continued as such for 20 years. The master soon became aware of the penetration and range of his pupil's intellect, and we are told that he described him as 'the intellect of the school.' At this time, too, it is said that A. taught rhetoric in opposition to Isocrates, who was doubtless a representative example of the teachers of superficial eloquence then popular. In 347 Plato d., having appointed his nephew Speusippus master of the school. This fact induced A., who might well have expected that his own pre-eminence would have gained him this position, to leave Athens. On the invitation of Hermias, despot of Atarneus, he retired with a fellow pupil, Xenocrates, to the court of Atarneus. Hermias was himself an Academic, and his 2 friends lived quietly with him for 3 years until his death at the hands of a treacherous enemy. A. then retired to Mitylene, taking with him Pythias, the niece of Hermias, whom he afterwards married, and by whom he had his daughter Pythias. He had in later life 1 son, Nicomachus, borne to him by his concubine, Herpyllis. This son has, for some unknown reason, given his name to the chief of A.'s ethical writings—the *Nicomachean Ethics*.

In the year 342 A. was summoned to Macedonia by Philip to instruct his son, Alexander, then in his fourteenth year. For 3 years he was engaged in this task, after which he retired for a while to Stagira, which he induced the king to rebuild. Not until Alexander had ascended the throne did the philosopher finally leave Macedonia. So, in 335 B.C., he returned to Athens and the last great period of his life began. He opened a school at the Lyceum, a gymnasium which received



its name from its propinquity to the temple of Apollo Lyceus. The members of the school came to be called Peripatetics, from his habit of walking up and down while discoursing, or, possibly, from their meeting at a place called The Walk. The followers of Xenocrates, who had now succeeded Speusippus as head of the Academy, were known as Academics. This life went on for 12 years, when, in 323, Alexander d. The anti-Macedonian party at Athens began to gain the ascendancy, and the philosopher was accused of impiety on the grounds that he deified the tyrant Hiermias. The charge was absurd, but A., mindful of the fate of Socrates, thought it prudent to retire to Chalcis in Euboea, where, in the autumn of 322, he d.

His writings have unfortunately come down to us in a very confused form. It is certain that many of those attributed to him are not his, and the condition of the genuine works is far from satisfactory. The language of most of them is abrupt, and conversational promises are made and then forgotten; there are sudden breaks in the thread of the argument; sometimes they are redundant, sometimes inconsistent. In a word, it is evident that these writings, which have so profoundly affected the thought of all succeeding ages, were neither completed nor arranged by the writer himself. It has, indeed, been suggested that they are nothing more than the notes taken down by his scholars from dictation, and afterwards ed. by them. This hypothesis is refuted both by the extreme compression of parts of the works and by the fact that A. generally lectured while walking, and a far more probable explanation is that the works as we have them are, in the main, the unfinished notes and discourses of A. himself. Much of their disconnectedness may be attributed to the length of time over which their composition was probably spread, and to the development of his theories during this time. Strabo, the geographer, relates that on the death of A. his library, after passing through many hands, came into the possession of Andronicus of Rhodes, and became the basis of his ed. of the *Works* prepared c. 70 B.C.

The extant writings may be divided on the basis of the mediæval classifications under the heads of Logic, Natural Science or Physics, First Philosophy or Metaphysics, Ethics and Politics, Literature. The works on logic, grouped together by his editors as the *Organon*, comprise *Categoriæ*, on the 10 classes of predicates; *De Interpretatione*, on language, dealing with the proposition and its parts; *Analytica Priora*, in 2 books, dealing with the syllogism; *Analytica Posteriora*, in 2 books, dealing with the method of scientific demonstration; *Topica*, on dialectical syllogism and reasoning from probabilities; *Sophistici Elenchi*, on the fallacies which the Sophists made use of in refutation and their solution. The treatises on natural science include 4 important works on physics: *Physica* *Auscultatio*, treating of the general prin-

ciples of natural science; *De Cælo*, a treatise on astronomy; *De Generatione et Corruptione*, on generation and corruption in general; *Meteorologica*, discussing sublunary phenomena.

A second div., chiefly biological, would include *Historia Animalium*; *De Partibus Animalium*, on the causes of the facts about animals; *De Generatione Animalium*; *De Anima*, on the soul as connected with the body; *Parva Naturalia*, comprising 8 works on sense, memory, dreams, etc. A.'s one work on the subject which he called First Philosophy is the *Metaphysica*, so called on account of its having been placed in the first ed. of his works 'after' the treatises on physics. The work gives a sketch of previous philosophical systems, and then deals with the causes, principles, and properties of Being, and treats of God as the prime Mover of the world. The ethical and political works include *Æthica Nicomachea*; *Æthica Eudæmia*; *Magna Moralia*, all concerning the good of the individual; *Politica*, on the good of the state; *Æconomica*, on the good of the family. This last is probably the work of a later school. In the domain of literature, though the philosopher had intended ultimately to deal with all forms of art, only 2 works are comprised, but one of these, *De Poetica*, has, mainly through the misunderstandings of mediæval commentators, affected the hist. of all European literature. The other, the *Ars Rhetorica*, is less important.

*Aristotle's Philosophy.*—Though A. never allows us to forget the great degree in which he differed from his master Plato, yet it is important to remember that he can always speak of the Platonic tenets as those which we hold. In fact, A. was probably much more in sympathy with Plato than were his immediate successors at the Academy. Yet their difference as to the attitude of inquiry was fundamental, and may thus be briefly put: Plato takes his departure from the eternal, from the universal form; A. from the actual world of nature, from the individual substance. Plato was a poet and an idealist; A., though possessing a great range of interest, is fundamentally a man of science. Their points of agreement and difference are well shown in the *Metaphysica*, where we see that whereas Plato finds reality only in the universal 'idea', A. seeks it in the individual things, which he defines as a combination of the universal-form and matter. Yet both agree that the reality or essence of the thing lies in the idea. But a more important divergence is in A.'s criticism of the Platonic 'ideas' as being only potential and not actual causes of the phenomena of the world. Hence is elaborated the famous doctrine of the 4 causes which combine to produce any individual object, and which give 4 lines of inquiry when investigating it. These are: (1) the material cause, or the material conditions of its existence; (2) the essential cause, giving its essential character and realisation; (3) the actual cause, through the agency of which it comes into being; (4) the final cause, giving the end or result attained

by it. But the work deals also with theology, and A. expressly speaks of the prime and unmoved movement of the earthly and heavenly bodies as God. His language on the subject is simple, and perfectly clear. God is the supreme excellence, more excellent than anything that we can attain to. He is perfect, with eternal and continuous life. The philosopher then explains the anthropomorphic mythology of the time as accretions which have been added for the use of the vulgar to the original conception of a single divinity investing the whole of nature. There are many omissions in the scheme of the first philosophy, and difficulties are multiplied by the fact that A. had to invent many of his technical terms and that he did not always use them in the same sense. The invention of logic was, perhaps, the prin. work of A. He regarded it as no true part of philosophy, but as its handmaid or instrument, and hence the name *Organon* given to the group of treatises on the subject. Even this name was given it by the later Peripatetics. The founder of logic himself gave it no name, neither subdividing the subject nor combining it into a system. It is noteworthy, too, that in his classification of the sciences he gave no place to this one of his own evolution.

A.'s scientific treatises have long since fulfilled their service. His researches show insight, observation, and knowledge; but their intrinsic value was never great, and in later ages they showed signs of becoming a positive hindrance to progress through the reverence felt for his great name.

The metaphysical and physical philosophy, together with the logical treatises, were grouped together by the author as speculative science; while practical philosophy comprised the *Ethics*, *Politics*, and treatises on Art. The *Politics* are the application to the state of the principles which had been applied to the individual in the *Ethics*. Briefly, they consist of the old question: 'What is man's greatest good, and how can it be realised?' There are various degrees of goodness, of which the chief are theoretical wisdom, which is the highest, practical goodness, and goodness of character. The first of these is the contemplation and comprehension of the loftiest principle of the universe. Practical goodness consists in the carrying out of the moral virtues. Goodness of character is the habit of mind which enables a man to choose the mean between extremes of extravagance. These last 2 forms of goodness should not be neglected by the philosopher, but should be developed at the same time as the highest. Since, however, reason is obviously the highest faculty of the soul, being, in fact, the one thing which differentiates man from the other organic bodies and approximates him to God, it should receive the supreme place. In the *Politics* the subjects dealt with are the good of the individual citizen, which should consist in the happiness of virtuous action, and the good of the state. Right govts., then, are those which aim at the general good, and they

may be either: (1) *Monarchies*, the rule of one man excelling in virtue; (2) *Aristocracies*, the rule of a class excelling in virtue; or (3) *Commonwealths*, the rule of the many who excel in virtue. On the other hand, the wrong govts. are perversions of these 3 forms. A wrong gov. may be: (1) a *Democracy*, aiming merely at the good of the majority; (2) an *Oligarchy*, aiming at the good of the few; or (3) a *Tyranny*, aiming at the good of one man. All these last are distinguished by the fact that their aim is the benefit of the ruling body rather than that of the whole community. Last to be considered are the 2 works in which the art of production is dealt with, the *Rhetorics* and the *Poetics*. The first is a treatise on the art of persuasion, and its influence has been almost nil. In the *Poetics*, A. shows himself a literary critic of the first order. After a subdivision of the kinds of poetry, he deals at length with tragedy, which, he says, 'by raising pity and fear, purges the mind of these passions.' Perhaps no literary judgment has given rise to more controversy as to its meaning, controversy which is not yet ended. From the commentators on this work, and not from the work itself, is gathered the famous theory of the 3 unities which was so long attributed to A. himself. Misunderstanding though it was, it has influenced the whole course of European drama. Not until the Middle Ages did the period of A.'s greatness begin, and then he was known only in Arabian translations. From the translations of Avicenna and Averrhoes his philosophy was taken up by the schoolmen, and made the framework in which to arrange the theology of the Christian Church. His writings were generally received as the summary of sciences, and as such they were taken up and reconciled to the Catholic dogmas, which his philosophy was used to express, by the great St. Thomas of Aquinas. With the Renaissance came a natural reaction, but even here, the philosopher himself recovered rather than lost prestige. His works were studied in the original, and many of the errors of his commentators removed.

*Literature.*—The standard ed. of the complete works is still that of Bekker (5 vols., Berlin, 1831-70). Eds. worthy of note containing particular works are Pactus's *Organon* (Frankfort, 1592), Waltz's *Organon* (Leipzig, 1884-86), Aubert and Wimmer's *Historia Animalium* (Leipzig, 1868), Bonitz's *Metaphysics* (Bonn, 1848), Hicks's *De Anima* (Cambridge, 1907), Bywater's *Ethica Nicomachea* (Oxford, 1890), and *Poetica* (London, 1898), Cope's *Rhetorica* (Cambridge, 1877), and Butcher's *Poetica* (London, 1898). Eng. translation of *The Physics* by P. H. Wicksteed and F. M. Cornford, in 2 vols. (1930); Eng. translation in 3 vols. ed. by W. D. Ross (1931); A. S. Owen, *Aristotle on the Art of Poetry* (1931); A. K. Griffin, *Aristotle's Psychology of Conduct* (1931); W. Jaeger, *Aristotle* (trans. 1934); Eng. translation of *The Politics of Aristotle* by Sir E. Barker, 1948.

*Aristotle's Lantern*, a jaw-apparatus

in the sea-urchin, consisting of 5 hard pointed teeth in sockets formed by 5 ossicles. The teeth protrude through the mouth-membrane and are actuated by muscles that enable them to be drawn together or apart, inwards or outwards. The animal is thus enabled to scrape algae and seaweeds from the rocks to feed itself.

**Aristoxenus** (fourth century B.C.), a Gk. philosopher, pupil of Aristotle. He wrote, amongst other works, a treatise on music, rejecting the mathematic system of Pythagoras.

**Arita**, a tn. of Japan, on the is. of Kiushiu. It is famous for the manuf. and export of porcelain. Pop. about 6000.

**Arithmetic**, that branch of mathematics which treats of numbers. The study of A. is included in every scheme of education, mainly on account of its bearing on the practical side of everyday life. Measurement and the calculation of money values are dependent on some theory of number, and it is difficult to realise what we owe to the system of numeration by local value which we have adopted from the Hindus. The Gks. and Roms. used clumsy symbols, and some idea may be formed of the difficulty of calculating in such symbols by attempting, say, to multiply CLIX by MDIV without using the decimal notation. The Hindu, or, as it is commonly called, the Arabic, system was introduced into Europe in the eleventh century, the double rule of three, or compound, proportion was introduced in the sixteenth, and in the next century Napier of Merchiston invented his system of logarithms, since when there has been little advance in the rules of A. proper.

A. as usually taught in schools consists of the consideration of the 4 elementary operations: addition, subtraction, multiplication, and division; the application of those rules to measures of length, weight, money, etc.; the splitting up of numbers into factors, leading to the determination of least common multiple and greatest common measure; the system of fractions, vulgar and decimal, and its application to the determination of values by what is called practice; and the rule of three, or proportion. An attempt is usually made to introduce ideas relating to commercial life by calculations on imaginary transactions involving percentages, interest, simple and compound, stock investments, bill discounting, etc., but sometimes this is relegated to what is called commercial A.

The value of A. as a school subject is threefold: it serves to equip the pupil for carrying on business involving quantities and values, it has a disciplinary or purely educational effect on the mind, as its processes illustrate the methods of reasoning, and it serves as an introductory step to the study of mathematics generally, which in its turn has its educational and purely utilitarian values. The disciplinary value depends mainly upon the methods of teaching, but the practical utility of A. depends upon the ease, accuracy, and rapidity with which the simpler relations of addition and multiplication can be recollected. It is customary and neces-

sary, for the addition of all pairs of numbers up to 10, and the multiplication of all pairs of numbers up to 10 or 12, to be learned 'by heart.' That is, there should be no necessity to call up any mental image of the quantities involved in the addition or multiplication; 7 times 9, for instance, should suggest 63 with certainty at once.

Text-books are numerous, and the number increases yearly, but the following may be referred to as being of general interest: Sir Oliver Lodge, *Easy Mathematics*, chiefly *Arithmetic*, 1905; L. Seeley, *The Grube Method of Teaching Arithmetic*, 1890; D. E. Smith, *The Teaching of Elementary Mathematics*, 1900; F. A. Yeldham, *The Story of Reckoning in the Middle Ages*, 1926; L. T. Hogben, *Mathematics for the Million*, 1936.

**Arithmetical Complement** of a number is the difference between that number and the next highest power of 10, e.g. the A. C. of 6 is  $10 - 6 = 4$ ; of 49 is  $100 - 49 = 51$ ; and of 7642 is  $10,000 - 7642 = 2358$ .

**Arithmetical Mean** is a quantity which has an intermediate value between two other quantities; thus the A. M. between 9 and 17 is 13, i.e. half of the sum of 9 and 17.

**Arithmetical Progression** is a series of numbers which increase or decrease by a common difference, such as 2, 4, 6, 8, 10, 12, or 25, 20, 15, 10, 5. If  $a$  denote the first term,  $l$  the last term,  $d$  the common difference, and  $n$  the number of terms, then  $l = a + d(n-1)$  and the sum of all the terms =  $\frac{(a+l)n}{2}$ .

**Arithmetical Proportion**, see ARITHMETIC and PROPORTION.

**Arius** (c. 256-336), founder of the Arian heresy, was b. in Libya, and became one of the chief figures of the first great controversy in the Church. He went to Alexandria, and was there ordained deacon. In the Meletian schism he sided with Meletius and suffered excommunication. He later repented and was received back into the Church by Achillas, bishop of Alexandria, who then ordained him presbyter, and gave him the charge of one of the city churches. So great was the repute of A., that on the death of Achillas he expected to receive the see, but Alexander was chosen. When quite an old man, about the year 321, A. first broached his heresy, which in a less developed form had long been current at Antioch, where he had received his education. He denied that the Son was co-eternal with the Father, though affirming that He was begotten before time, and that by Him the Father created all things. A.'s aim was to prevent the idea of there being 2 Gods, and to solve this he described the Son as a created Being, though far surpassing all others. Alexander excommunicated his presbyter, who refused to give way, and sought help throughout N. Africa. Alexander also sent a circular letter to the bishops informing them of the course of events. Many favoured A., and the chief of his supporters was Eusebius, bishop of Nicomedia, who had been his fellow student at Antioch. A. was a fine

propagandist, and in his *Thalia* he explained his doctrines in verse set to music which was soon sung throughout the land. The controversy soon reached Rome, and Constantine, failing to realize the importance of the dogma in debate, made efforts for a compromise. This failing, he called the first ecumenical council at Nicea in 325. Athanasius, deacon of Alexandria, was the chief exponent of the orthodox view. The orthodox insisted that the Son was 'of the same substance' (*ὁμοούσιος*) with the Father, and round this word the battle raged. A. was condemned, and, with 2 bishops who supported him, banished to Illyria, while the orthodox creed was promulgated. The continued support of Eusebius of Nicomedia secured the recall of A. in 320, and he secured the ear of the emperor. Constantine, finding it impossible to compel Athanasius, now bishop of Alexandria, to reinstate the heretic, banished the prelate to Gaul in 335. At last, in 336, Alexander, bishop of Constantinople, was persuaded to consent reluctantly to admit A. to communion, but before this was done the latter was taken suddenly ill, and within a few hrs. was dead. After his death, Arianism became practically extinct in the empire before the end of the fourth century. For a couple of centuries longer it lingered among the Goths and other Teutonic tribes who had received Christianity from Arian missionaries, chief of whom was Ulfilas.

**Arizona** (Indian Sp. meaning 'few springs' or the 'dry belt'), a state of the Union, N. America, situated between Utah on the N., New Mexico on the E., Mexico on the S., and California and Nevada on the W. It ranks fifth among the U.S.A. with a gross area of 113,956 sq. m., 100 sq. m. of this being water. The state is divided diagonally into 2 parts by the Mexican Cordilleras. The N. region consists of a plateau, broken by high mts., which in the San Francisco Range attain a height of over 12,700 ft. In the S. and S.W. are wide, desert plains watered by the Salt and Gila Rs. The Colorado and its trib. the Little Colorado, water the N.W. region. The ann. precipitation ranges from 1 to 10 in. in the W. and from 10 to 25 in. in the E. Few crops are grown without irrigation in the lowlands, the climate being dry and clear, suitable for astronomical observations, and the soil unproductive. Several large reservoirs have been constructed, the most notable being the Roosevelt dam. The Yuma project for tapping the lower Colorado has recently been completed. Projects have also been made for supplying water for electrical power to the state copper mines. The most important crop is cotton, but wheat, barley, corn, etc., and semi-tropical fruit are also cultivated. Cattle and sheep are reared on the pasture lands, and the forests (13,668,000 ac.) provide good timber. The state is rich in mineral deposits, the greatest output being in copper, gold, silver, and lead, while granite, limestone, asbestos, and quicksilver are also worked in the state. The chief industry is the smelting and

refining of copper. A state univ. was founded at Tucson in 1885. There is also at Tucson a state agric. school. Enormous subterranean caves, rivaling the Mammoth Caves of Kentucky, were discovered in 1909. The country was discovered by Marcos de Niza, a Spaniard, in 1539, rumours of its wealth having reached Spain through the explorer, de Vaca. In the following year Vasquez de Coronado explored the country, but the earliest settlements were made by Sp. missionaries at Tucson and Tubac about 1772. A. remained under the influence of Spain till 1821, when it achieved its independence. In 1848 it was ceded to the U.S.A., and was organized as a ter. In 1863, becoming a state of the Union on Feb. 14, 1912. In Congress, A. is represented by 2 members of the lower House and 2 senators. In 1940 the pop. was 499,000; in 1946 (estimated), 661,500. There are still 35,000 Indians. Pop. of Phoenix, 65,400; Tucson, 36,800; Bisbee, 5800; Globe, 6100, and Douglas, 8600.

**Ark of Noah**, see DELUGE.

**Ark of the Covenant** was the name of the sacred chest of shittim (acacia) wood borne by the Israelites in the journey in the desert. In contained the 2 tablets of the law (Deut. x. 2). It figured at the taking of Jericho, where it was borne, as was the rule, by the Levites. It was captured by the Philistines and set up in the temple of Ashdod. Finally it found its resting-place in the temple of Solomon.

**Ark Royal**, Brit. aircraft carrier, commissioned in 1939. Standard displacement 22,000 tons; main armament, sixteen 4.5-in. guns; h.p. 102,000; maximum speed, 30.75 knots. She was the third of her name in the annals of the R.N., and, in her record a worthy successor to the first, the ship of 800 tons burthen, which bore the Lord Admiral's flag in the fleet which defeated the Sp. Armada in 1588. In peace time her full complement, including flying personnel, was 1575, a high proportion of whom were always highly trained officers and men. She was torpedoed by a Ger. submarine in the W. Mediterranean near Gibraltar at about 6.30 p.m. on Nov. 12, 1941, and sank some 12 hrs. later. Throughout her 2 years of service in the Second World War no ship was so frequently 'sunk' by enemy propagandists as was the *A. R.*, yet, in fact, beyond a few scratches by splinters of bombs which fell in the sea, she suffered no damage in action until hit by a torpedo and sunk. Early in the war L./C. Franke was actually promoted and received a congratulatory letter from Goering (q.v.) for having 'sunk' her in the North Sea with a bomb. Later the *A. R.* disconcerted the enemy by appearing at Cape Town in search of the *Graf Spee*. It was her aircraft which ensured the destruction of the *Bismarck* (q.v.) in May 1941. Many ships of the It. Navy bore scars from the blows of her bombers, as did numerous bombers and reconnaissance craft of the *Regia Aeronautica*. Altogether some 67 It. aircraft fell victim to those of *A. R.* After being torpedoed she

struggled along for nearly 12 hrs. with a large hole amidships, but at 4.30 a.m. (Nov. 13) her captain (L. E. H. Maund) gave the order to abandon ship. She sank 25 m. distant from Gibraltar. Only 1 man was lost, the whole of the rest of the crew being taken off by a destroyer which came right in under the rails of the carrier, which was then listing heavily. Hundreds of men slid down ropes to the deck of the destroyer. Whalers launched from the ship picked up other men swimming in the sea. The discipline and coolness of men of the R.N. have seldom been more strikingly exemplified. All were landed in Gibraltar.

**Arkansas**, a S.-central state of the U.S.A., bounded on the N. by Missouri, E. by the R. Mississippi, S. by Louisiana and Texas, and W. by Texas and Oklahoma. The surface of the state is very varied. It may be divided about equally into the N.W. highland div. and the S.E. lowland div. Out of the broad alluvial bottoms of low elevation which border the Mississippi R. and its chief W. tribs. rise the Coastal Plains, which extend N.W. to the Boston Mts. belonging to the Ozark Uplift. The Mississippi forms the E. border, while its chief trib., the Arkansas, bisects the state from W. to E. Other important rivs. are the St. Francis and White Rs. to the N., and the Saline, Ouachita, and Red Rs. to the S. The climate is pleasant and healthy, except in the malarial swampy district of the E. The normal rainfall is from 45 to 55 in., but even this is not sufficient for the ricefields, which have to be flooded through artificial means. The chief product is cotton. Irrigation has made rice-growing an important industry, much fruit is grown, and maize and oats. It is the only state in which diamonds have been found. Over a million tons of coal are raised annually and upwards of 25,000,000 barrels of petroleum. Lumber and timber products hold the first place in industry. There are good railroads, except in the mountainous dists. of the N. and W., the chief being those which connect the cities of the N.-central states with the Gulf cities on the S. There are natural hot springs, world-famed as a cure for rheumatism and kindred ills, and the tn. of Hot Springs has sprung up beside them. A. was visited by the Spaniard, de Soto, in 1541, but the first settlement was made by Frenchmen at A. Post in 1686. The Mississippi was explored further by Marquette and Joliet (1673) and La Salle (1682), and the ter., after passing through Fr. and Sp. hands, was purchased by the U.S.A. in 1803. A. was made a ter. in 1819 and admitted as a state into the Union in 1836. Area 53,335 sq. m. One-third of the population is Negro. The railways are required to provide separate cars for them. Pop. 1,949,000. The chief cities are: Little Rock, the cap., 88,000; Fort Smith, 36,500; Pine Bluff, 21,200; N. Little Rock, 21,100; Hot Springs, 21,300; El Dorado, 15,800; Texarkana, 11,000.

**Arkansas City**, city of Cowey co., Kansas, U.S.A., on the A. and Walnut Rs., Manufs. flour and paint. Pop. 12,750.

**Arkansas River** is, next to the Missouri, the largest trib. of the Mississippi. It rises in the mts. of central Colorado, and flows eastward until about 98° W. long. It then flows S.E. until it reaches the Mississippi. Total length about 2000 m.

**Arkeeko**, a seaport on the W. coast of the Red Sea, 3 m. S. of Massowah.

**Arklow**, a small seaport of Eire, in co. Wicklow, some 50 m. S. of Dublin. There is much sea-fishing, and oyster-beds are numerous. Near it are the ruins of Shelton Abbey, the seat of the earl of Wicklow. The city was stormed and dismantled by Cromwell in 1649, and in 1798 it was the scene of sanguinary conflict between the Gov. and the United Irishmen. The tn. stands at the mouth of the R. Avoca, the valley of which is justly famous for its scenery; pop. 5000.

**Arkona**, the N.E. promontory of the Ger. is. of Rügen, in the Baltic Sea. On its summit is a lighthouse whose light is visible for 35 m., and on the W. are the ruins of the temple of the Wend deity, Svantevit.

**Arkwright**, Sir Richard (1732-92), a famous inventor of cotton-spinning machinery, was b. at Preston in Lancashire, the youngest of 13 children. His parents were poor, and he was early apprenticed to a barber. He estab. himself in this occupation at Bolton in 1750, where his profits were increased by his invention of a special method of dyeing human hair. He also gave himself to the study of the cotton machinery, but, as he had little mechanical skill, he secured the assistance of John Kay, a watchmaker of Warrington, in the carrying out of his designs. About 1767 he seems to have invented his celebrated *spinning-frame*, of which the chief value was its provision of the warp, which Hargreaves's spinning-jenny had been unable to supply. In 1769 he took out a patent for this, and erected his first mill at Nottingham. In 1771, with Jedediah Strutt and Samuel Need as partners, he built larger factories at Cromford, in Derbyshire. In 1775 he took out a fresh patent for further improvements, but these patents were continuously infringed on all sides, and in 1781 he took action in the courts. Public opinion, however, was inimical to him, and the verdict was unsatisfactory. The working classes hated him as a labour-saver, but his common sense enabled him to amass a fairly large fortune.

**Arlaud**, Jacques Antoine (1668-1743), a celebrated miniature painter, was b. and d. at Geneva. He was held in great reputation in Paris, and came to England in 1721. In London he painted the miniatures of the Pretender's sister and of the duke of Marlborough. He bequeathed many books and curios to the library at Geneva.

**Arlberg**, a mt. of the Rhetian Alps, between the Tyrol and Vorarlberg, which 2 provs. are connected by the A. Pass, nearly 5900 ft. above the sea. A railway

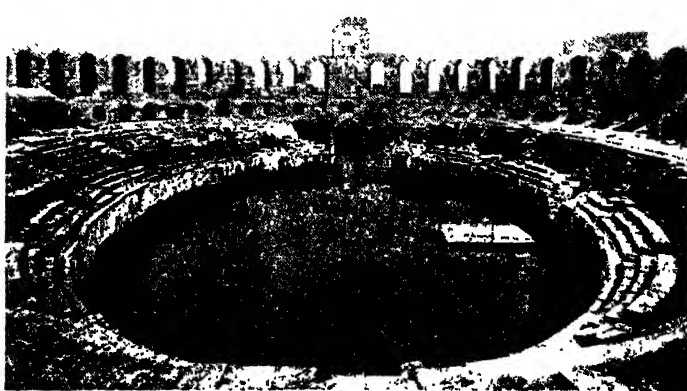
tunnel, constructed 1880-84, is now in use. Its highest point is 4300 ft.

**Arlen, Michael** (real name, **Dikrân Kouyoumdjian**), novelist, an Armenian; b. at Rustchuk, Bulgaria, in 1895; educated at Malvern College; naturalised Brit. subject, 1922. In 1920 he had pub. *The London Venture*, and 2 years later his *Piracy* obtained favourable notice. Other books of his are: *These Charming People*, 1923; *The Green Hat*, 1924; *May Fair*, 1925; *Lily Christine*, 1928; *Young Men in Love*, 1929; *Babes in the World*, 1930; *Men dislike Women*, 1931. The first 2 of these he has dramatised.

**Arles**, a tn. of S. France, dept. Bouches-du-Rhône, on the l. b. of the Rhône, 17 m. S.E. of Nîmes, united with the Mediterranean harbour of Bouc by a canal.

**Arling**, the old name for the bird wheat-ear.

**Arlington**: 1. A banking post tn. in Massachusetts, U.S.A. Pop. 36,000. 2. Locality in Virginia. Near this Virginian tn., on the heights across from Washington, is situated the most famous of American cemeteries. The building and grounds were once the home of Robert E. Lee, the commander-in-chief of the Confederate armies during the Civil war. The grounds were taken over by the Federal Gov. Here he buried over 33,000 soldiers, among whom are many of the famous Federal officers of the Civil war. The body of the unknown soldier lies here in a splendid monument. Just as every year on Nov. 11 the Brit. royal family attends the services at the Cenotaph in London, so in the U.S.A. every



THE AMPHITHEATRE, ARLES

It is famous for its Rom. remains, which include baths, a palace of Constantine, an aqueduct, and an amphitheatre. Under the later Rom. emperors was one of the most flourishing of the Oltropicaline tns. It was a free city in the twelfth century. The old cathedral of St. Trophime, the finest Romanesque church in Provence, stands in the centre of the tn.; its chief portal, dating from the twelfth century, is a masterpiece of graceful arrangement and rich carving. The fifteenth-century church of St. Julien was destroyed by bombing from the air in the Second World War, and bombs also fell on the arenas and the old Rom. cemetery of Aiscamps. A. possesses flour-mills and oil and soap works, and sheep-breeding is a considerable industry in the vicinity. Pop. 31,014.

**Arlincourt, Charles-Victor Prévôt** (1789-1856), a Fr. author, was b. at the castle of Merantris, near Versailles, and d. in Paris. He held sev. gov. positions, but soon retired and gave his time to literature. Among his works are *La Caroléide*, a poem; *Le Siège de Paris*, a tragedy; and sev. novels.

year on the same date special services are held in A. attended by the President and Cabinet.

**Arlington, Henry Bennet, Earl of** (1818-1885), was b. at Arlington, Middlesex, and educated at Westminster School and Christ Church, Oxford. He was wounded in the Civil war, and employed afterwards by Charles as his agent at Madrid. Returning to England at the Restoration, he was a member of the unscrupulous 'Cabal'; he was created Lord A. in 1663, and earl of A. in 1672. He was impeached as a promoter of popery, a self-aggrandiser, and a betrayer of trust in 1674, and on the impeachment falling through he retired to his Suffolk seat, Euston.

**Arliss, George** (1868-1946), stage and film actor. B. London, Apr. 16. Made his first stage appearance at the old Elephant and Castle theatre, London, 1887. Made his first tour in the U.S.A. with Mrs. Pat Campbell, 1901. In New York created role of Zakkuri in *The Darling of the Gods*, 1902. After that year he devoted most of his acting time to theatres in America, where he became

a universal favourite. In recent years he only played 1 season in England, where he repeated his Amer. success in *The Green Goddess*, by William Archer. He also made a great reputation as a film star with impersonations of Disraeli, Wellington, Rothschild, and Voltaire. President of the Episcopal Actors' Guild of America. Author of plays (*There and Back and Widows' Weeds*), and of an autobiography *George Arliss, by Himself*, 1940.

**Arlon**, a Belgian tn., is cap. of the prov. of Luxembourg. It is a thriving place, having a considerable trade in corn, iron-ware, tobacco, clay pipes, and crockery. It is mentioned as early as A.D. 870; pop. 12,000.

**Arm**, the fore or upper limb in man from the shoulder to the wrist. The *humerus*, or bone of the upper arm, has at its upper extremity a convex spheroidal surface which fits into the glenoid fossa of the scapula, or shoulder-blade. The lower extremity has a small head or *capitellum* for articulation with the *radius*, and a *trochlea* or pulley for guiding the movements of the *ulna*. The *ulna* and *radius* are the bones of the forearm, and are articulated with each other and with the wrist-bones at the lower extremity.

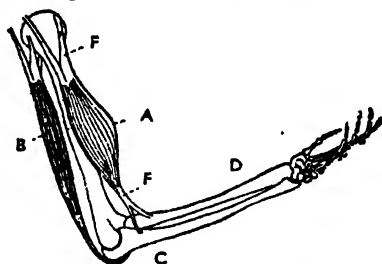
The *deltoid* is the large muscle forming the shoulder cap, and serves to raise the A. from the side; it runs from the shoulder-blade to the middle of the humerus. The chief muscles engaged in lowering the A. again are the *latissimus dorsi*, attached to the front of the neck of the humerus, the *coraco-brachialis*, attached to the middle of the front of the humerus, and the *pectoralis major*, which forms the front fold of the armpit. The A. is flexed by the *biceps*, running from shoulder to elbow-joint in front, and is straightened by the *triceps*, running from shoulder to elbow at the back of the A. The muscles of the forearm consist of the flexors and extensors of the wrist and fingers.

The chief arteries are the *axillary*, passing under the armpit, and becoming the *brachial* as it traverses the upper arm, and the *radial* and *ulnar* arteries, which are the branches of the brachial running down the lower arm.

Fracture of the upper end of the humerus may result from direct or indirect violence. The neck or narrow part underneath the head is the most frequent seat of the fracture, which may result from a fall upon the shoulder, or indirectly from a fall on the outstretched hand or elbow. The bone is usually broken transversely, and after reduction has been effected, there is little risk of displacement again occurring if proper precautions be taken. A pad is placed under the armpit, the A. bound to the side, and the wrist supported by a sling. Fracture of the shaft of the humerus is usually caused by a blow on the A. The pieces frequently fail to unite, as muscular contraction is difficult to overcome. If the fracture occurs above the insertion of the deltoid muscle, the A. is put in splints, bound to the side, and the forearm bent at right angles; if it occurs below the insertion of the deltoid, the A. should hang vertically.

In either case the splints should be kept on for 4 or 5 weeks. Fractures of the lower end of the humerus are commonly caused by falls on the outstretched hand, and if not carefully treated may leave the patient with a stiff elbow. The fracture should be reduced under an anæsthetic, and the A. fixed with the elbow flexed as far as it will go. After a fortnight, passive movements should be commenced, and the amount of bending gradually increased.

Of the bones of the forearm, the *radius* is more liable to fracture, but both may be broken by a direct blow or by a fall. If the fracture is badly set, Volkmann's contracture may supervene. This is a condition in which the straightening of the wrist automatically flexes the fingers, which can only be extended again by bending the wrist. Colles's fracture is a



ARM, WITH FOREARM FLEXED

A, biceps; B, triceps; C, ulna; D, radius; F tendons.

fracture of the lower end of the radius, from  $\frac{1}{2}$  in. to  $1\frac{1}{2}$  in. above the articular surface. It is usually caused by a fall on the open palm when the elbow is slightly flexed, and produces a characteristic displacement of the lower fragment and the hand. When fixing the A. in splints, the fingers should be left unconfined, so that after the first day the patient may move them freely; this is necessary in order that adhesion of the tendons to their sheaths may not occur.

**Armada**, Spanish. Armada is a Sp. word, signifying simply an armed force, but applied specially to the great Sp. fleet fitted out against England in 1588. Philip II., the then king of Spain, had resolved to strike a decisive blow at Protestantism by conquering England, which had been formally handed over to him by Pope Sixtus V. The A. was under the command of the duke of Medina Sidonia, and consisted of 130 great war galleons, with 30 smaller ships of war. It carried 19,295 marines, 8460 sailors, 2088 slaves, and 2360 guns. It was scattered by a storm when it left Lisbon on May 29, 1588, and had to put in to Corunna to be refitted. It passed through the Eng. Channel towards Calais, as it was to work in co-operation with a land force collected in Flanders under the duke of Parma. But instead of going to the coast of Flanders to take in the troops there, the Sp.

admiral decided to sail directly to Plymouth and destroy the shipping in the harbour. In its progress the A. was attacked by the Eng. fleet under Lord Howard, with his lieutenants Drake, Hawkins, and Frobisher, who refused to come to close quarters, but attacked the enemy at a distance, pouring in broadsides with great dexterity. The great lumbering galleons were no match for the swift and easily handled Eng. vessels, and galleon after galleon was sunk, boarded, or driven on shore. The Eng. followed up the A. and harassed them with a running fire all through the week, till they took refuge in the port of Calais. Howard sent 8 fireships into their midst at midnight, and the Spaniards, in terror, cut their cables and stood out to sea. The Eng. ships came up with them at dawn off Gravelines, and after 6 hrs. furious fighting the Spaniards' best ships were shattered to pieces, and drifted upon the sand-banks of Holland with a N.W. wind. More than 4000 of their men had fallen, whilst not more than 100 of the Eng. had been killed. At a hasty council of war the Spaniards decided to return to Spain by sailing round the Orkneys. The Eng. ships were compelled to retire soon, owing to lack of powder, of which the ill-timed economy of Elizabeth had stinted them; but the storms of the N. seas finished the work of destruction. But 54 vessels of the 'glorious A.' returned to the ports of Spain, and those in a hapless plight. The inhab. of the Hebrides and the W. coast of Ireland treated the survivors from the vessels wrecked on their shores to a short shrift. The seamen and sailors who survived were so dispirited by their discomfiture that they were never weary of decanting upon the desperate valour of the Eng., and the unsurpassed violence of the tempestuous ocean which surrounds the Brit. Isles. The Eng. queen had a medal struck bearing the inscription, 'Deus flavit, et dissipati sunt.'—'God blow, and they were scattered.'

**Armadales**, tn. of Linlithgowshire, Scotland, 2½ m. S.W. of Bathgate. Near it are large chemical works. Pop. 5000.

**Armadillo** (genus *Dasyus*) is an edentate mammal peculiar to S. America, consisting of various species; it belongs to a family intermediate between the sloths and the ant-eaters. They are not, however, toothless, but have a variable number of simple molars, interlocking when the mouth is shut. They are covered with a hard bony shell, consisting of shields on the forehead, shoulders, and haunches, and of movable cross bands of plates across the back. They are of nocturnal habits, feeding on insects, worms, fruits, and roots; they are inoffensive, and their flesh is edible.

**Armageddon**, in the Apocalypse, is the place of the 'battle of the great day of God,' when the last fight will take place between the powers of good and evil. Its name is indubitably taken from that famous battlefield (Judges v. 19) in the plain of Esdraelon, where the chief battles of the Israelites were fought.

**Armagh**, an inland co. of N. Ireland, which is bounded on the N. by Lough Neagh, on the E. by co. Down, on the S. by Louth, and on the W. by Monaghan and Tyrone. Its area is about 512 sq. m. The N.W. of the co. is undulating and fertile. The N., however, consists principally of extensive bogs, and on the S. border is a range of barren hills. The chief rivs. are the Blackwater, which separates A. from Tyrone; the Upper Bann, which discharges itself into Lough Neagh; and the Callan, which flows into the Blackwater. There are sev. small lakes. The geological features of A. are: Lower Silurian rocks in the S. and centre; the trap of Antrim, with the underlying greensand, in the dist. round Portadown; carboniferous limestone in the basins of the Blackwater and Callan; granite in the S.E. mts.; and Tertiary strata in the neighbourhood of Lough Neagh. Lead veins have from time to time been worked in various parts of the co. The climate of A. is supposed to be one of the most genial in Ireland, with the least rainfall of any co., and it offers a relatively large area of cultivable soil. The number of cattle, sheep, pigs, and poultry is increasing. Agriculture, however, is not far advanced, the prin. crops being oats and potatoes, but all grain crops are decreasing, and flax, which was formerly grown to a considerable extent, is now neglected. Owing to the linen industry, however, the inhab. are generally in fairly comfortable circumstances. This manuf. is the prin. one, though it has somewhat declined in modern times. Apples are grown in such quantities as to entitle the co. to its name, 'the orchard of Ireland.' Communications are monopolised by the Great Northern railway, whose main line from Belfast divides at Portadown, sending off lines to Omagh, Clones, and Dublin. A branch from Omagh joins the Dublin line to Gorrageewood, and from this line there is a branch to Newry in co. Down. An electric tramway connects Bessbrook, a tn. with important linen manufs., to Newry. Pop. 109,000. The chief tns. are Armagh (7600), Lurgan (12,600), Portadown (11,700), and Bessbrook (2900). Assizes are held at A. The co. returns 4 members to the Parliament of N. Ireland and 1 to that of Great Britain and Ireland. The co. tn., A., is the see of an archbishop of the Protestant Episcopal Church, who is primate of all Ireland. It is of great antiquity, and has a Gothic building dating from the eighth century, and a Protestant as well as a Rom. Catholic cathedral.

**Armagnac** was the name formerly given to a dist. in the S. of France, a part of Gascony now generally included in the dept. of Gers. It has a fertile soil, and is noted for its wine and brandy.

**Armagnac**, Counts of, were members of an anc. ruling family of the Fr. prov. of A.; they held sway from 1319 to 1525. The most celebrated member of this family was Bernard VII., who gave the name of A. to the faction which was opposed to the Burgundians in the Civil war of 1410-35. In 1410 Bernard VII.



married his daughter to the young Duke Charles of Orleans, and henceforth was the head of the Orleans, or A. party. The Burgundians, who were in reality the popular party, had on their side the univ., the common people of Paris, and the powerful guild of the butchers; whilst the A., or aristocratic party, were supported by Queen Isabella and the princes and aristocracy of Paris. Parliament kept aloof from the struggle, supporting neither side. The A. faction had for their banner that of the A. family, a white flag, whilst the Burgundians carried the cross of St. Andrew. The struggle of the rival parties was terminated in Sept. 1435 by the treaty of Arras, when the Burgundian court was reunited to that of France.

**Armament, Limitation of.** See DISARMAMENT.

**Armand-Dumaresq, Charles Édouard** (1826-95), a Fr. painter. His work consisted of military pictures, portraits, and water-colour drawings. The titles of some of his pictures are: 'Charge de la division Desvaux & Solferino,' 'Cambronne à Waterloo,' and the 'Défense de Saint-Quentin.'

**Armature,** the arrangement of coils which in a dynamo passed through the magnetic field, thus inducing a current. The A. may be stationary and the magnets movable, or vice versa. The term is also applied to the piece of soft iron which connects the poles of a horse-shoe magnet when not in use. It affords a good path for the lines of force, and thus tends to retain the magnetism which is lost through an air gap.

**Armed Neutrality,** a league of the N. powers of Europe—Russia, Denmark, and Sweden—formed in 1780, which first gave international validity to the principle that 'free ships make free goods.' A proclamation of Catherine of Russia laid down that (1) neutral ships may sail freely from port to port and along the coasts of belligerents, so long as they do not carry contraband of war; (2) that only real and effectual blockade shall be recognised. The doctrine was accepted by Prussia and Austria in 1781, but refused by Great Britain. The league was suspended at the peace of 1783, but revived in 1800 for a short time. The settlement of the questions in international maritime law involved in the doctrines of the league was only made in 1856 by the declaration of Paris.

**Armengaud, Jean Germain Désiré** (1797-1869), a Fr. writer. He devoted his time to the study of art, visited the museums of Europe, and became a great critic. Amongst his works are: *L'Histoire des peintres de toutes les écoles, depuis la Renaissance jusqu'à nos jours*, 1849; *Les Galeries publiques de l'Europe*, 1856-65; and *Les Chefs-d'œuvre de Rubens à la cathédrale d'Anvers*, 1859.

**Armenia** (or **Hyastan**).—A Soviet Socialist Republic, occupying uplands between the Persian plateau and Asia Minor and bounded on the N. by the Black Sea, on the S. by Kurdistan, on the E. by Azerbaijan, and on the W. by Turkey. Before the First World War, A.

comprised the whole of the lofty tableland in the upper valleys of the Euphrates, Tigris, Aras, and Kur; it was 400 to 500 m. long, about the same in breadth, and covered about 63,000 sq. m. It had ceased, however, to exist politically long before the First World War and was shared between Turkey (35,600 sq. m.), Persia (6520 sq. m.), and Russia (20,600 sq. m.). But the area of the present republic of A. is no more than 11,900 sq. m. It will be convenient in describing the physical features of A. to include the whole of the old tableland, which, intersected by the Tigris, was formerly divided into A. Major and A. Minor. This country is an elevated plateau, partly surrounded by the ranges of Taurus and Anti-Taurus, and in part occupied by other mts., of which M. Ararat is the highest. To the E. of the valley of the Aras, the plateau of Kara Bagh reaches a height of 11,000 ft. The mt. system is mostly volcanic, trachyte and angite porphyry being mainly represented. The numerous cones are for the most part old craters. The Murad Su (E.), and the Kara Su (W.) Euphrates form the head waters of that riv. The head waters of the Tigris are formed by the Shett, rising to the S. of Van Lake, and an arm of the Diarbekr, rising in the Alinjik Dagh. Even the present diminished A. can still claim that the Rs. Euphrates, Tigris, Kur, and Tchorokh all take their rise within its boundaries. There are 3 climatic regions distinguished in A. A region of rains, with a sub-tropical climate, extends along the valley of the Kur from 1815 to the Caspian Sea and the valley of the Upper Tigris; a region of perpetual snow, which on Mt. Ararat, the meeting of the former Russian, Turkish, and Persian boundaries, save on the N.W. side, starts as high as 14,000 ft., but which elsewhere begins at a height of about 11,000 ft.; and an intermediate region, of various grades, including the plateau chains, at a height of 12,000 to 13,000 ft. The last-named zone ranges from a S. European climate on the plain of the Kara Hissar to a mid-European climate, with a late harvest, on the mid slopes of the frontier mts. The volcanic, dry, and treeless plateaus have a very severe climate, with long and bitter winters, and short summers, very hot during the day, but invariably cold at night. The cold N. winds give rise to the storms which render the navigation of the Black Sea fraught with such great danger. Much the richest belt of vegetation is the broad valley of the Aras; but the marshes, caused by the number of irrigating channels, render this the most unhealthy part of A. Since the estab. of the Soviet Gov. (A. was proclaimed a Soviet republic on Apr. 2, 1921), irrigation works have been restored or constructed to a total length of nearly 190 m. There are, however, rich orchards and vineyards, and fields of tobacco, rice, hemp, flax, and cotton. A little corn is cultivated, but the high tablelands are chiefly pastoral in character. The hist. of A. has been

largely influenced by its physical features. The isolation of the valleys, especially in winter, encouraged a tendency to separation, which invariably showed itself when the central power was weak. The mts. have always served as the breeding-place of the independent and proud-spirited mountaineers, and as the sanctuary in times of invasion for the lowlanders. The country stood as an open doorway between the E. and the W. It connected the Iranian plateau with the protected harbours and fruitful lands of Asia Minor, and nations have striven for its possession from the remotest periods of antiquity. The original inhab. of A. are unknown, but about the middle of the ninth century B.C. the mass of the people belonged to that great family of tribes which seems to have been spread over the W. part of Asia, and to have had a common non-Aryan speech. There was, however, intermingled with this race an important Semitic element of Assyrian and Heb. origin. Between 640 and 600 B.C., the country was conquered by an Aryan people, forming a military aristocracy that was recruited from Persia and Parthia. They imposed their language, and possibly their name, upon the conquered inhabs., though apparently but a small amount of intermarriage took place. Many of the Aryan and Semitic Armenians migrated to Constantinople and Cilicia, after the Arab and Seljuk invasions; and the remains of the aristocracy were swept away by the Mongols and Tartars. The diversity of type and characteristics existing amongst the modern Armenians may be due to this fact. In the recesses of Mt. Taurus the peasants are tall, good-looking, agile, and brave. In A. and Asia Minor they are robust, thick-set, and coarse-featured, with straight black hair and large hooked noses. They are good cultivators of the soil, but are ignorant, poor, and superstitious. The townsmen have more regular features, approximating in many cases to the Persian type. They are remarkable for their industry, their aptitude for affairs, and their keen intelligence. They possess the same enterprising spirit which led their ancestors in Rom. times to trade with Scythia, China, and India. They are skilled artisans, bankers, and merchants, and many of the aristocracy have occupied positions in the public service of Turkey, Russia, Persia, and Egypt. The Armenians are essentially an oriental race; they have, like the Jews, whom they also resemble in their widespread dispersion and their exclusiveness, a remarkable indissolubility of national character and faculty of adaptation to circumstances. They are frugal, sober, and intelligent, strongly attached to old manners and customs, but with a promising desire for progress. On the other hand, they are greedy of gain, self-seeking, and unstable in character, and with a love of intrigue which has had an unfortunate influence on their hist. The conversion of King Tiridates, mentioned below is the earliest authentic account of the introduction of Christianity into A. In the same century

Armenian Christians studied at Athens. In the eccles. monophysite controversies of the fifth century concerning the nature of Christ, the Armenian Christians refused to accept the decisions of the Council of Chalcedon, and constituted themselves a separate church. The popes have at various times attempted to force them into reunion with the Rom. Catholic Church, but did not succeed in bringing about a lasting agreement.

All kinds of cereals and cotton, sesame, flax and hemp, rice and tobacco are produced in the valleys and plains; silk-worm breeding, sheep-rearing, and fruit culture are all capable of great development. There are large untapped mineral resources. Naphtha, bitumen, sulphur, and nitre are found, and the mts. yield precious metals, copper, iron, lead, marbles, and salts. Numerous hot and cold mineral springs abound, comparable, almost, to those of Vichy. There is a large carpet industry. To-day a large number of industrial enterprises have been estab., the chief being the Kirovakan Chemical Combine, the Davali Cement Works, a spinning-weaving plant, a large synthetic rubber trust, some soap factories, and cotton-cleaning works. The cap. is Erivan (pop. 111,500). The next tn. is Leninakan, formerly Alexandropol (53,000).

*History.*—The Armenians called themselves Haik, whence the Persian name of A., *Hajastan*; the Medes applied the name of a single obscure clan, A., to the whole land. Under this name they have been known as a nation since the time of Herodotus. Little is known of the early history of A., but it was a separate state as early as the eighth century B.C., when it became subject to Assyria, as it subsequently did to the Medes and the Persians. It was conquered by Alexander the Great in 325 B.C., but regained its independence c. 190 B.C. Its king, Tigranes, son-in-law of the celebrated Mithridates, after having been defeated by the Romans under Lucullus and Pompey, c. 69 B.C., was left on the throne. Shapur I., the second of the Sassanid kings, conquered A., but under Diocletian it was recovered for Rome, and Tiridates the Great returned to the throne. This Tiridates having been converted to Christianity by St. Gregory the Enlightener, A. became henceforward the bulwark of Christianity in Asia. After many vicissitudes of fortune it re-emerged in the ninth century into a state of considerable importance. In A.D. 885 Aschod I., who came of an old and powerful Armenian family, ascended the throne with the permission of the caliphs. He founded the third Armenian dynasty, that of the Bagratides, who claimed descent from King David of Israel. The imposing ruins of their cap. at Ani, between Echmiadzin and Kars, show that the kingdom prospered under their rule. Their dynasty lasted till the eleventh century, when the Gks. seized a part of the kingdom, weakened as it was by internal dissensions, and killed the last king of the Bagratides; the Turks and Kurds overran

most of the remainder, a few chiefs with difficulty preserving their local autonomy. The whole of A. Major was conquered by the Mongols in 1242. The last king of A., Leon VI., was taken prisoner by the Saracens in 1375. The E. part of A. became a Persian prov. in 1472, and the W. part was afterwards taken possession of by the Turkish sultan, Selim II. For a long time now A. was laid waste by the Mongols and the hosts of Timur, and fought for by the Ottoman sultans and Persia, till Russia at length gained possession of the whole of the upper valley of the Araxes. According to travellers, the Armenians enjoyed security of person and protection under the Russians, such as neither Turkey nor Persia granted to them. At the close of the Russo-Turkish war, Ardahan and Kars were ceded to Russia by the treaty of Berlin, 1878, thereby adding 6687 sq. m. and 271,000 persons to Russian suzerainty. There is no doubt that amongst the Armenians themselves at this period there was a widespread desire that Russia should be their ruler, if any nation were. Great Britain on this occasion secretly guaranteed that Turkey should retain her Asiatic possessions on condition that she brought about reforms, and protected the Armenians from the Kurds and the Circassians.

In the First World War A. was a coveted pawn in Germany's 'Drang nach Osten' dreams. Its mts. dominated the centre of the Berlin to Bagdad route. It was essential to the fulfilment of this dream that a vigorous campaign should be waged in A., so as to drive out the allied forces and thereby, ultimately, gain control of the Persian Gulf and the gate to India. In 1915 the Grand Duke Nicholas had concentrated in the Caucasus an army of 200,000 men for a great offensive in A. In the early months of 1916. Owing to the Brit. setback in Mesopotamia in the autumn of 1915 he launched the attack much earlier than he had intended. The Turks were heavily defeated near Erzerum (Jan. 16, 1916) and by the middle of Feb. the seemingly impregnable forts of Erzerum had been conquered and the tn. itself was hastily evacuated, an enormous booty falling into the hands of Gen. Yudenitch. By Apr. the brilliant strategy of the grand duke had resulted in the fall of Bitlis and the capture of the important tn. of Trebizond. Everywhere Cossack cavalry relentlessly pursued the demoralised Turks, and nearly the whole of the Turkish A. was now in the grasp of the Russian armies. Unhappily for allied hopes, the disastrous issue of Gallipoli set free the large Turkish army of that peninsula. Kut was besieged and Gen. Townshend surrendered (April 29, 1916). Thereafter, though the Russians captured Erzincan, their further advance was checked. Soon they had to abandon Bitlis again, and thenceforth the grand duke was on the defensive.

In 1918, during the Russian Revolution, an independent 'Republic of Trans-Caucasia' was formed by the union of A. with Azerbaijan and Georgia. The

'settlement' satisfied the Socialistic propagandists of Moscow as well as those crafty Ger. champions of the *Mittel Europa* dogma whose efforts were directed to detaching as many states from Russia as possible and giving them a hazardous autonomy dependent on themselves. This union, however, was dissolved in 1918, when the Allies recognised the independence of the Armenian republic. By the treaty of May 11, 1920, Turkey, too, recognised A.'s independence. Previously a mandate under the League of Nations had been offered to the U.S.A., but was not accepted. See also ARMENIAN ATROCITIES.

**Armenian Language and Literature.** The Armenian language belongs to the Indo-European family of languages, and is most closely connected with the Iranic group. The old Armenian or Haikan language is still the literary and eccles. medium and is distinguished from the ordinary spoken Armenian, which is of more modern origin, and contains a large proportion of Persian and Turkish elements. The language as a whole has many peculiarities of structure. There are 7 cases, and no distinction of gender amongst nouns; whilst there are in verbs 4 conjugations and 4 tenses. The E. dialect is much purer than that of Constantinople. The language has great strength and flexibility but is consonantal and harsh to the ear. The alphabet has 36 characters. No literary remains of the period before the introduction of Christianity exist save a few old songs and ballads. These suffice to show that the Armenians had adhered to the Assyrian or Medo-Persian system of culture. The Gk. language and literature soon became favourite objects of study, and many Armenian translations were made. At a later period the Gk. alphabet was used by the W., and Syriac by the E. Armenians. Arzan (d. 459) translated the works of St. Athanasius into Armenian, and wrote treatises against idolatry. In the beginning of the fifth century St. Mesrob, with Sahak the Great, wrote the Armenian translation of the Bible, which was esteemed the highest model of classic style. In the fourteenth century literature began to decline, and few works worthy of note were produced after this period; but since their dispersion the Armenians have always cherished their national literature. Armenian literature was purely monkish; there was not, as in the neighbouring country of Georgia, any epic or romantic literature.

**BIBLIOGRAPHY:** Robert Curzon, *Armenia: a Year at Erzerum, etc.*, 1854 (London); N. T. Grogan, *History of Armenia*, 1897 (London); H. F. B. Lynch, *Armenia: Travels and Studies*, 1901 (London); W. L. Williams, *Armenia, Past and Present*, 1916 (London); Morgan, *Histoire du peuple arménien*, 1919; M. J. Seth, *The Republic of Armenia*, 1924 (Calcutta); H. B. Dale, *Landmarks in Armenian History*, 1922; O. Baldwin, *Six Prisons and Two Revolutions (Adventures in Trans-Caucasia)*, 1920-21; F. Nansen, *Armenia and the Near East*,

1928; D. Tutaeff, *The Soviet Caucasus*, 1942.

**Armenian Atrocities.** After the change in Russian policy and the failure of the powers to secure reforms, following on the treaty of Berlin, the advanced party (Nihilist) amongst the As. determined to try to produce disturbances such as those that had given birth to Bulgaria, and so gain their object. The revolutionary movement was strongly opposed by the A. clergy and the Amer. missionaries; whilst its irreligion, and the self-seeking of its leaders, rendered it unacceptable to the mass of the people. In the summer of 1893 an emissary was captured near Mush, and a raid was made on the dist. by the Kurdish Irregular Horse, acting on the orders of the governor. The As. held their own both then and again when they were attacked in the spring of 1894. The sultan then issued a firman calling upon all loyal subjects to aid in suppressing the revolt, and regular troops were called up from Erzerum. A massacre of a most brutal character ensued, which aroused great indignation in Europe. In Nov. 1894 a Turkish commission of inquiry was sent to Armenia, accompanied by the consular delegates of Great Britain, France, and Russia, who elicited the fact that the action of the authorities was not justified. Great Britain pressed for reforms and coercion of the sultan, but was not supported by the other powers. During the negotiations disturbances occurred, and at Trebizond a massacre took place on Oct. 8, 1895. On Oct. 17 following the sultan accepted the scheme of reforms, but refused to publish it, and in Armenia massacre followed massacre in quick succession until Jan. 1, 1896. In the summer of 1896 there were massacres at Van, Egin and Inksar; and on Aug. 26 the Imperial Ottoman Bank at Constantinople was seized by revolutionists as a protest against the Christian powers who had left the As. to their fate. The Gov. had had warning of this, and at once turned loose the rabble, previously armed and instructed, on the streets; a 2 days' massacre followed, during which from 6000 to 7000 Gregorian As. perished. Resistance only served to aggravate the slaughter, Zeitun being the only place where a successful stand was made. There the people received honourable terms after 3 months' fighting. The actual perpetrators of the massacres were the local Moslems, aided by Lazis, Kurds, and Circassians. No one was punished for the massacres, but many were rewarded. Men and women were butchered in prisons and churches; schools, houses, and churches were plundered, and the destruction of property was enormous; the number of those that were killed was from 25,000 to 33,000, including those at Constantinople. Efforts by Great Britain and the U.S.A. to alleviate the distress met with some success, though opposed by the authorities. The A. revolutionary societies continued their propaganda down to the granting of the Turkish constitution in 1908; meanwhile further massacres occurred here and

there, notably at Mush in 1904 and Van in 1908.

In 1915 Christian Armenia was for the greater part of the year the scene of the most devastating massacres in the tragic hist. of that ill-starred country. In these massacres the most abominable cruelties were practised. Moslem eye-witnesses record that in the suburbs of Mush they saw large numbers of A. men, women, and children lying in the fields. Some had been shot, some stabbed, and nearly all horribly mutilated. On the way, from Mush to Hinis piles of bodies were seen lying at short intervals by the roadside, and between Hinis and Skerkis-Keul were seen 2 ravines filled with corpses, mostly of men, there being about 400 in each ravine. The Turks had, in fact, aimed at exterminating an entire race, in order to destroy any possible chance of A. acquiring autonomy then or at any future time; and such protesting voices as were raised were, in the nature of things, few and ineffective. Further massacres took place at the time of the revival of Turkish aspirations in Europe and the Græco-Turkish war, 1922, and mobs of wretched refugees flocked into Baqubah in Iraq to seek the protection of the Brit. authorities, and later were sent down to Basra.

**Armentières**, a Fr. tn. in Nord, 10 m. W.N.W. of Lille, on the R. Lys, has manufs. of linen and cotton goods, lace, soap, etc., and a large trade in grain. It was the centre of the heaviest fighting in the battle of Picardy during the great and final drive against the Brit. armies (Mar. 1918). In 1914, during the race to the Channel ports, the Gers. captured the tn., but were driven out by the Brit., who occupied it until Mar. 1918, when the Gers. overwhelmed it with shell-fire (second Somme battle). Pop. 21,000.

**Armfelt**, Gustav Moritz, Count of (1757-1814), was b. in Finland. He displayed remarkable courage and spirit during the war between Sweden and Russia, 1788-90, and as military representative of Gustavus III. concluded the peace of Verelä. He went as ambassador to Naples, and entered into correspondence there with certain parties in Sweden for the purpose of overthrowing the regency, which was in the hands of the duke of Sudermania. The plot was discovered and he was deprived of all his powers and titles. He was restored to favour and honour in 1799, when Gustavus IV. received the crown. He was afterwards obliged to flee to Russia, being implicated in the poisoning of the prince of Augustenburg. There he received high honours.

**Armiak**, cloth woven of camel's hair by the Tartars, also a caftan made of A. **Armidale**, a tn. of New S. Wales, Australia. Gold, wolfram, and antimony are mined there and it is the centre of a sheep-rearing dist. Pop. 7000.

**Armiger**, see ESQUIRE.

**Armilla** (Lat., ring), a bracelet which was worn by both sexes among the Medes, Persians, Gauls, and Sabines. Both Gks. and Romans looked upon them as feminine adornments, but in some cases of signal

merit an A. was conferred publicly upon Rom. soldiers.

**Armillary Sphere.** The Lat. word *armilla* signifies a bracelet, and an A. S. is one in which the principal circles of the heavens are shown by means of metal rings put together in their relative position. By its means many observations and calculations were made by the anc. astronomers, but its use for this purpose has been superseded by the celestial globe.

**Armin, Robert**, a comic actor and author, was a contemporary of Shakespeare. He was a pupil of the famous actor Tarleton, and amongst other Eng. actors visited Scotland. He was one of the players licensed by James I., and he played in Shakespeare's dramas. His works are *The Italian Taylor and his Boy*, 1609; *A Nest of Ninnies*, 1608; and *The History of the Two Maids of Moreclacke*, a drama printed in 1609.

**Armine, Sir William** (1593-1651), was a Parliamentarian, and became M.P. for Boston, Grantham, and Lincolnshire. He refused to levy an arbitrary loan in Lincolnshire and was imprisoned. He was afterwards sheriff of Lincolnshire, and of Huntingdonshire; and a member of the council of state, 1648; 1650, and 1651.

**Arminians**, see ARMINIUS, JACOBUS.

**Arminius**, a famous chief of the Ger. tribe of the Cherusci, was b. 16 B.C. Sent as a hostage to Rome, he served in the Rom. army, and reached the rank of eque. Returning home, he placed himself at the head of the discontented tribes near the Rhine, and completely annihilated the Rom. army under the governor, Quintilius Varus. He was assassinated in A.D. 19, having been suspected of aiming at kingly power. A monument to his memory was unveiled near Detmold in 1875.

**Arminius, Jacobus**, or Jakob Harmensen, founder of Arminianism, was b. in 1560 at Oudewater in S. Holland. He studied in the univ. of Leyden, and at Geneva, where his chief theological tutor was Theodore Beza. He was appointed minister of a church in Amsterdam on his return, and was chosen to refute a work which was totally opposed to Beza's doctrine of predestination. He was, however, convinced by the arguments of the work, and on declaring his opinions openly in 1603, he was to the end of his life engaged in a series of bitter disputes with his opponents. A. asserted that God bestows forgiveness and eternal life on all who repent of their sins and believe in Christ; Franz Gomar and his party maintained that God had by an eternal decree predestinated what persons should be saved. A. died of a complicated disease in 1609.

**Armistice** is a temporary suspension of hostilities between 2 opposing belligerent powers by mutual agreement. It is sometimes concluded for a few hours to allow of a parley, burying of the dead, etc.; a general A. is the usual preliminary to a peace. A general, as opposed to a partial or local A., suspends all military and naval operations of the belligerents

and, being concluded by the commanders-in-chief on behalf of their respective govts., requires ratification. The dates of the various As. in the First World War were; Central Empires-Russia, Nov. 29, 1917; Rumania-Central Empires, Dec. 7, 1917; Central Empires-Ukraine, Feb. 9, 1918; Allies-Bulgaria, Sept. 29, 1918; Allies-Turkey, Oct. 30, 1918; Allies-Austro-Hungary, Nov. 3, 1918; Allies-Germany, Nov. 11, 1918. The famous A. of Nov. 11, 1918, was concluded by Marshal Foch and Adm. Wemyss for the Allies with the civil and military representatives of Germany. The allied representatives were, however, acting under the fullest instructions from the Supreme Council in Versailles. This A. was modified sev. times before ratification, and under it the Gers. had to evacuate the invaded territories, including Alsace-Lorraine, within a fortnight and fall back to a stated distance beyond the Rhine, thereby establishing a neutral zone, and obviating any possibility of collision between the troops. Germany was to bear the cost of maintaining the armies of occupation in the Rhineland and Alsace-Lorraine. The other primary conditions imposed on Germany included the surrender of 10 battleships, 14 battle cruisers and light cruisers, 50 modern destroyers, and all her U-boats; also 5000 heavy and field guns, 30,000 machine guns, and 2000 aeroplanes, besides a large quantity of rolling-stock and lorries.

The treaty of Versailles, concluded in 1919, embodied these provisions with, of course, extensive additions. In the forest of Compiègne is an A. monument situated in a *Carrefour de l'Armistice*, which was unveiled on Nov. 11, 1922. It marks the spot where the Gers. signed the A. and bears the inscription: 'Ici le 11 Novembre 1918 succomba le criminel orgueil de l'Empire allemand vaincu par les peuples libres qu'il prétendait asservir.' There exists no similar monument in England, but the Cenotaph in Whitehall serves much the same purpose. In 1940 Hitler, having routed the Fr. armies, forced the Fr. commander, Pétain, to an A., which was signed in the forest of Compiègne on June 22 (regardless of the existence of a Franco-Brit. agreement forbidding the making of a separate A. or peace). This A. was tantamount to unconditional surrender and put the Gers. in occupation of the N. half of France and the whole Fr. coast. With a sense of the melodramatic Hitler's plenipotentiaries met those of France in the forest of Compiègne on the same spot, in the same railway coach as that in which Foch had handed his terms to the Gers. in 1918. A Fr.-It. A. was signed at a villa near Rome on June 24. There was no A. at the end of the war. On Mar. 14, 1945, it was announced in Washington that allied military leaders were prepared to accept unconditional surrender of Ger. units of any size but would not enter into any A. or truce.

**Armisticio**, a ter. of Venezuela, bounded by the states of Los Andes, Zamora,

Bolivar, and the United States of Colombia. Area about 7100 sq. m. The region is fertile, being well watered by the tribs. of the R. Orinoco.

**Armley**, formerly township of West Riding, Yorkshire, England, on R. Aire, formed part of Leeds by Leeds Corporation Act 1926.

**Armorial Bearings**, a general term for heraldic insignia. Strictly speaking, it should be confined to those devices 'borne' on the shield.

**Armorica** was the country of the Armorici, who occupied the coast of Gaul between the Seine and the Loire in the first century B.C. In later times the name was confined to Brittany.

**Armour**. See **ARMS** and **ARMOUR**.

**Armour, Donald John** (1869-1933), Canadian neurologist and brain surgeon, b. in Ontario; son of a Canadian chief justice and president of the Court of Appeal. Lettsoman lecturer, Medical Society of London, 1927, and president of that body, 1929-30. Wrote *Surgery of the Spinal Cord and its Membranes and Injuries to the Brain and Spinal Cord*.

**Armour, Philip Danforth** (1832-1901), Amer. merchant and philanthropist, b. at Stockbridge, New York. In 1863 he founded the firm of A., Plankington & Co., pork packers, at Milwaukee. In 1870 the firm removed to Chicago and was reorganised as A. & Co., becoming the largest of its kind in the world. A. founded the A. Institute of Technology and the A. Mission in Chicago.

**Armoured Cars**. A. C. form part of the Tank Corps and are organised into companies. A company consists of 4 sections of 4 cars each, with 1 extra car. In the First World War conditions on the W. Front only favoured the use of A. C. in the later phases, and they were mainly employed in Egypt, Mesopotamia, Ger. E. Africa, Palestine, the Indian frontier, and Persia, and in these regions they played an important part both in conjunction with cavalry or other troops and as independent units. Medium type A. C. are armed with a machine gun carried in a single revolving armoured turret. The engine and petrol tank are also armoured. The maximum speed is 60 m.p.h., and the radius of action without carrying extra petrol is 400 to 500 m. on good roads and half that distance on loose ground. The crew, including car commander and driver, numbers 4. The general functions of A. C. are reconnaissance and operation as advance guards or rear-guards. They may sometimes be useful for augmenting outposts, and can also be used for independent missions, such as seizing important tactical points in advance or on the flank of the enemy. A. C. are especially useful in co-operating with cavalry, for they can relieve cavalry of tasks entailing extensive movements and, during an advance, can locate and repel slight opposition before the cavalry approach. For patrol work A. C. are invaluable, as was proved in Shanghai in 1927-28. Most of the regular cavalry regiments have been converted into A. C. regiments, by combining squadrons of

A. C. and light tanks operating wholly as mechanised units.

**Armoured Corps, Royal**, created in Apr. 1939, when it consisted of 18 cavalry regiments and all the units of the Royal Tank Corps, which later was renamed the Royal Tank Regiment. Most of these cavalry regiments had already been mechanised, and their incorporation in the R.A.C. confirmed the permanent substitution of the internal-combustion engine for the horse. Strictly the hist. of the R.A.C. begins only in 1939, but its very existence is due to the tank and armoured car, which had records dating from the First World War, and indeed sev. of the regiments now forming part of it first saw service more than 250 years ago. In 1927 an 'Armoured Force' was formed on Salisbury Plain, made up of a reconnaissance group of tankettes and armoured cars, a main group of about 50 medium tanks, supporting artillery, a machine-gun battalion, and Royal Engineers and signal services, but not all armoured. This force was the first armoured formation, and on its work was founded the principles in use throughout the R.A.C. in later years. The conversion of the 11th Hussars and the 12th Lancers in 1928-29 into a 'cavalry armoured car regiment' was the forerunner of wholesale conversion 10 years later, when only the Household Cavalry, 1st Royal Dragoons (converted into an armoured car regiment during the Second World War), and Scots Greys remained horsed cavalry. The formation of the R. A. C. was announced immediately after this conversion, thus concentrating all the armoured units of the Army into 1 corps. The 10 years' delay was regrettable but was due to constantly changing tank design and tactics, parl. refusal to incur heavy military expenditure, and prejudice in favour of the horse. When the bulk of the cavalry regiments were converted, some were mechanised as light tank regiments, and some as 'mechanised divisional cavalry regiments.' The latter performed the role of the old horsed divisional cavalry—i.e., primarily that of reconnaissance and holding ground for short periods—and, for these duties, they were equipped with light tanks and scout carriers very similar to the later Bren-gun carriers. After the Dunkirk evacuation in 1940 these divisional cavalry regiments were not re-formed as such. In Mar. 1940 it had been decided to group them into 'Armoured Reconnaissance Brigades,' and when the B.E.F. advanced into Belgium, these regiments, preceded by armoured cars, led the advance. But after Dunkirk their duties were performed by battalions of the Reconnaissance Corps. Armoured cars were widely used in the First World War, and formed the nucleus of the 'Light Armoured Motor Batteries' of the Machine-Gun Corps, which operated mainly in the Middle E. Later they became incorporated in the Armoured Car Companies of the Tank Corps when it was reorganised after the war. In the period before the Second World War almost all the Brit. armoured cars were in India,

and saw service on the N.W. Frontier. The R.A.F. also used them with advantage in Iraq. The 1st Royal Dragoons (armoured car regiment) played a very notable part in the operations in the W. Desert in 1941-42 and in Tunisia. The Queen's Bays (tanks) also rendered effective service with the Eighth Army and, later, with the First Army against the Axis forces in N. Africa. For reconnaissance work the armoured car still holds its place and should do so unless and until it is displaced by a silent high-speed tank. For operating behind the enemy's lines, a high-speed tank, however, is always the better weapon. The armoured car was originally evolved as a method of transporting a machine-gun; but it has long become a distinct weapon in itself, and one with which all modern armies must be equipped. The fact that no invasion of Britain took place in 1940 enabled the War Office to proceed with mechanisation and motorisation. Thus many of the units re-formed after Dunkirk became 'motor-machine-gun regiments,' and later the motor-machine-gun brigades became armoured brigades, and very soon new armoured divs. were in existence. Some of these armoured forces fought with great success in Libya, Greece, Burma, and elsewhere. When the R.A.C. was formed the Royal Tank Regiment retained its corps badge. The badge of the R.A.C. is a mailed fist in a plain circular frame, with a crown at the top. Training for the corps is carried out at the Armoured Fighting Vehicle School, which comprises the Driving and Maintenance Wing, Wireless Wing, and Gunnery Wing. Consult J. R. W. Murland, *The Royal Armoured Corps*, 1943.

**Arms and Armour** (Lat. *arma*, arms). From the earliest times man's ingenuity has devised weapons of offence and defence. The oldest relics we have are of stone weapons, these in course of time being superseded by bronze and iron. The heads of battle-axes, spears, and arrows made of stone have been found in many parts of the world, the only defensive armour commonly used contemporaneously being shields. The shields of the earliest period were of bronze, and round in shape, being held in the left hand by a handle under the central boss. The Israelites are said to have used a larger and a smaller shield; the larger, trans. 'shield,' 'buckler,' or 'target,' belonged to the heavy spearmen and lancers (1 Chron. xii.), the smaller, rendered in the Bible 'shield' or 'buckler,' was carried by archers (1 Chron. v.; 2 Chron. xiv.). With the advent of bronze and, shortly after, iron, we find swords of various shapes becoming almost universal, while means of protection also greatly increased. The Gks. had shields, helmets, greaves, and cuirasses of bronze; their offensive weapons, usually made of the same metal, consisted of spears, lances, javelins, and swords. Homer, in his works, describes these arms, and refers in the *Odyssey* to the use of the bow. In his time, however, the principal weapon was the spear, the sword being short and

used at close quarters for stabbing. The protective armour was heavy, and later a quilted coat was substituted for the cuirass. The size of the shields, too, was reduced from time to time; the older forms, being sufficiently large to cover the whole body, became more noticeably cumbersome with the increased use of the sword. The Romans had much the same armour, but generally of iron and lighter than that of the Gks. The cuirass of the Romans was shaped to the figure, and furnished with shoulder-guards and a series of pendent plates which extended almost to the middle of the thigh. The Gk. shield was round or oval, while the Romans had 2 common forms, 1 small and round or oval, the other large and rectangular. The Roman shield was commonly of wood, hide-bound, and protected by metal; the sword short, 2-edged, and pointed. The metal cuirass, too, gave way among the legionaries to a leather tunic, strengthened by bronze or iron rings attached to the exterior; and a kind of chain armour was latterly worn by the horsemen. Both the Egyptians and Assyrians were expert in the use of the bow, which found little room in the Gk. or Roman camps. Chariots with swords projecting from the axle on each side and large catapults originated among the Assyrians, while battering-rams were commonly employed. Among these nations the helmet seems to have come into use at an early period, and while it varied greatly in shape, the face of the wearer was usually left unprotected. Greaves, too, were in common use for the protection of the leg between the knee and ankle and were often worn only on one leg, the one advanced in combat. In contrast, the Germanic races relied largely on battle-axes and swords, while their protection consisted of large shields constructed at first of light wood covered with leather. Through Roman influence, these were bound and strengthened by leather and the size was reduced and, at the same time, defensive armour was adopted after the Roman style, with some modifications. By degrees the defensive armour was improved until the time of the Norman Conquest, when we find the invaders armed with long lances in addition to battle-axes and long swords. Bowmen took a prominent position among the Normans, but from the Bayeux tapestry the bows appear to have been only about 3 ft. long. About this time, too, the cross-bow was introduced. Long before the time of the crusades chain mail was in general use among the N. nations. The Holy war, however, kindled an enthusiasm for this kind of personal defence, and under the feudal system the period of the prim. development of body armour was reached. Every man had the A. and A. which appertained to his rank and condition. The old form of helmet was discarded for a larger one, which completely enveloped the head and was fitted with a visor to protect the face, leaving only small apertures for air and sight when down. In the eleventh and twelfth centuries the

armour consisted of a hauberk or tunic of mail for the body, hose of mail for the legs, a conical helmet, and a circular or kite-shaped shield. Towards the end of the twelfth century the round shield became rare, being superseded by triangular or flat-iron-shaped shields. In the second half of the thirteenth century, the mail defences of the limbs were reinforced by shoulder-pieces, elbow- and knee-pieces, and greaves or shin-pieces. The armour was also extended from the man to the horse. During the fourteenth century complete suits of plate armour came into use, and much was done to strengthen the joints and weak spots. Indeed, so perfect did the protection become that it was the exception to cause much injury in fighting without actually beating the armour in. Horses, too, were protected by metal plates which covered the body but allowed free play to the limbs. The face being hidden when the visor was closed, coats-of-arms were engraved or worked upon the shield and cuirass as means of recognition. This work became more and more elaborate, gold being used in the decoration; and surcoats, richly worked with the distinctive arms of the wearer, were commonly worn, the shapes and colours being of infinite variety. The waistbelt from which the sword hung, and which sometimes confined the skirt of the surcoat, was most conspicuous, the art of the goldsmith and jeweller being lavished in its construction. During the early part of the fifteenth century the surcoat disappears and also the horseman's shield, the size of which had been gradually diminishing. The armour grows still more perfect, overlapping plates being used for the joints, the legs completely encased in tubular jambards of metal, whilst the feet were enclosed in sollerets of articulated plates; while the gauntlets are improved by joints corresponding to those of the fingers. Great freedom of action was obtained and comfort was increased by the use of these overlapping plates or tonlets, as they were called, another improvement of the sort being the substitution of the salet for the older and heavier bassinet, a helmet resting on the crown, whence the camail, a piece of chain plate, fell, covering the chin, neck, and shoulders. The salet or salade is a form of helmet, fitting on the head like a cap, but with no visor as a rule, and with a projecting brow.

From this point the advance stops, owing to the introduction of gunpowder into warfare, and we find suits of mail rapidly going out of use, although they are sometimes met with in the seventeenth century. No doubt, too, the need for rapid and long movements had much to do with this, as the armour was proof against early firearms. Strategy and fortifications displaced the old scheme of warfare, and very quickly among foot soldiers we find greaves abandoned and the rest of the armour put away piece by piece, owing to its weight. Pikemen and cuirassiers still retained the breast and back plates in the seventeenth century, together with a steel cap and skirt of

tassets, but these were quickly dying out, and before the close of the century were unknown as methods of defence. But in the Second World War body armour was being supplied to Amer. Army airmen in the form of 'flak jackets' or vests—light but strong armour. Made in 2 sections, the jacket covered back and front from neck to waist. The vest was of fabric, with squares of 20-gauge manganese steel sewn in so that they overlap on all sides, giving complete coverage of chest and neck. The vest would resist a .45 bullet at 30 ft.

The deadly Eng. long-bow was 5 or 6 ft. in length, the arrow itself being 3 ft. The cross-bow, or arbalest, came into England with the Normans, and consists of a steel bow released by a trigger, the whole being set on a wooden stock. Its use was forbidden to Christians by Rome, and was antecedent to that of the long-bow. The first firearms were introduced to England in the fourteenth century, breech-loading cannon being the earliest form with projectiles of shaped stone. The hand gun was not known until 2 centuries later, and then was so heavy as to require a stand. The early forms were fired by a slow-match applied to the touch-hole, and in many respects resembled the cross-bow. These were improved by the invention of the match-lock and again by the wheel-lock and snap-hance, or flint-lock. In these forms the gun remained in use until 1807, when Alexander Forsyth patented the percussion-lock; then followed the needle-gun, and the breech-loading rifle superseded the old muzzle-loading system. Then came magazine rifles, and later rifling, which was an old patent, became customary, when the advent of machinery made accuracy easy. Pistols and revolvers are the result of guns being modified for cavalry, and their advancement is generally concurrent with that of guns, the same principles being applied. The idea of the machine gun can be traced back to the fifteenth century, when numbers of muskets mounted side by side were used for defensive purposes. Many forms of this type were found, but the first single gun was the Gatling, which contained a number of barrels revolving round a central axis. The Gatling was followed by the Fr. Montigny mitrailleuse, the Gardner, and the Nordenfeldt, all of which employed the multi-barrelled system, and were hand-operated. The Maxim gun, introduced in 1883, was the first type of single-barrelled automatic gun, followed by the Hotchkiss the Vickers, the Lewis gun, and many others during the first quarter of the twentieth century. Almost every country has now developed some form of heavy and light machine gun of its own type. The latest developments in A. include the rifle-grenade discharger, the self-loading rifle, and machine guns of larger calibre for use against tanks and armoured vehicles.

Artillery A. have developed from the metal cannon firing rough projectiles to the powerful weapons of the World Wars period, consisting of guns and howitzers



capable of firing explosive shell at long range with great accuracy.

The peculiar objects and properties of the various A. and firearms are dealt with under their respective headings. There are many collections of A. and A. throughout Europe and America. Among the innumerable works on the subject worthy of mention are those of Grose, Howitt, Pollard, and Dr. Meyrick.

**Arms, Coats of, ensigns or armorial bearings,** are the distinguishing devices used to denote particular families, corporate bodies, kingdoms, etc., throughout the world. They are usually granted or assigned by schools of heraldry.

**Armistead, Henry Hugh** (1828-1905), Eng. sculptor, b. in London, educated at Royal Academy under Bailey, Leigh, and Carey; became an R.A. 1879. His work includes part of the frieze at the base of the Albert Memorial, carved oak panels in the robing room at the New Palace of Westminster, the effigies of Bishop Wilberforce at Winchester and Lord John Thynne in Westminster Abbey, and a marble statuette of 'Remorse', now in the Tate Gallery. See *Life* by C. W. Armistead, 1906.

**Armstrong, Archibald, or Archy** (d. 1672), court jester to James I. and Charles I. of England. He greatly disliked Buckingham and Archbishop Laud, and, in the presence of the latter, said the following grace, 'Great praise be given to God and little Laud to the devil.' On hearing of the insurrection in Scotland when Laud endeavoured to introduce the liturgy there, A. taunted Laud, saying, 'Who's a fool now?' Incensed, Charles I. dismissed him from court, and he retired to Arthuret, Cumberland.

**Armstrong, Mrs. Helen Porter,** see MELBA.

**Armstrong, Henry Edward** (1848-1937), Brit. chemist. Prof. of chem. at City and Guilds College, S. Kensington. Awarded the Davy Medal, Royal Society, 1911, for research work in organic and general chem. Much successful research in terpenes, naphthalenes, etc., and physical chem.

**Armstrong, John** (1709-79), a Scottish poet and physician, was born at Castleton, Roxburgh, and educated at Edinburgh Univ. Practised in London. Remembered as the friend of Thomson, Mallet, and other literary celebrities of the time, and as the author of a poem on *The Art of Preserving Health*, pub. 1744, and in which a somewhat uncompromising subject for poetic treatment is gracefully and ingeniously handled. His other works, consisting of some poems and prose essays, and a play, *The Forced Marriage*, are forgotten, with the exception of the 4 stanzas at the end of the first part of Thomson's *Castle of Indolence*, describing the diseases incident to sloth, which A. contributed.

**Armstrong, Samuel Chapman** (1839-93), an Amer. soldier and philanthropist, b. in the Hawaiian Is. Son of missionary parents; served on the Union side in the Civil war, and acquired distinction as a commander of Negro troops. Founded the Hampton Institute for Negroes and

(later) Indians. He was interested in the 'Indian Question.'

**Armstrong, William,** or 'Kinmont Willie,' a famous moss-trooper of Sark in Dumfriesshire. Captured in 1596, he was imprisoned in Carlisle Castle by the Eng. warden and rescued by the Scottish warden, Scott of Buccleuch.

**Armstrong, Sir William George,** first Baron (1810-1900). Brit. engineer, b. at Newcastle-on-Tyne; he was articled to a firm of solicitors and afterwards became a partner. His tastes, however, lay elsewhere, and, in 1840, he produced an improved hydraulic engine, and, 2 years later, a hydro-electric machine. In 1845 he invented the hydraulic crane. The next year he founded the Elswick engine works (Newcastle). Here he commenced the manuf. of the A. rifled cannon (which he invented) and other ordnance, in which he was very successful. In 1858 he was knighted, and shortly afterwards appointed chief engineer of rifled ordnance under gov., which position he retained till 1863, when he returned to Newcastle. In 1887 he was created a peer with the title of Baron A.

**Army. General Sketch of the Hist. of As.**—From the beginning of the hist. of the world we have evidence that more or less organised As. played a prominent part in the hist. of their countries. The early oriental nations, such as Egypt, Assyria, and Persia, all possessed large As., which were easily raised and placed in the field in time of war. A standing A. was, of course, not known, except in so far as the kings had special corps of picked soldiers to act as their bodyguard and to form a nucleus for an A. in time of war. The earliest A. of which we have any record is that of the Egyptian Rameses II., who ascended the throne of Egypt about the year 1300 B.C. He, with an A. which numbered well over a million, is supposed to have conquered W. Asia right up to the boundaries of India. To him also is ascribed the formation of a warrior caste, the members of which had to serve in his As. when necessary, had certain of the taxes remitted as a kind of retaining fee, and were also granted militaryiefs. Herodotus describes the A. gathered together by Xerxes, and which, according to his computation, numbered well over 2 millions of men. This A. took full 4 years to mobilise, and it was only at the end of the fifth year that Xerxes and his A. set forth on their campaign.

Military science was fairly developed by both the Egyptians and the Persians, and the method of raising an A. on a system of quasi-conscription was introduced by the Egyptians. The principles of attack and defence were elaborated by the As. of Assyria. The hist. of Gk. As. falls into sev. well-defined periods. In the most anct. Gk. hist. the As. assembled round their kings and leaders, in what was practically a feudal levy. The Grecian A. before Troy can be taken as an example of this. In the latter days of Gk. hist. a system of conscription can be said to have existed. Every

citizen of Athens had to serve in the A. and had to undergo military training during a given period, after which he was placed in a certain reserve section of the A., and was liable to service when called upon. In many cases military service formed the basis for political gov. The A. was divided into infantry and cavalry, the greater part of the pop. serving as infantry, while the richer men formed the cavalry. For some very long period, however, the cavalry was a very secondary part of the Gk. A. In Sparta the whole nation was the A., every man being compelled to serve between the ages of 18 and 60, the military training being much more severe than elsewhere. The A. was composed of hoplites, the cavalry, and sev. regiments of light-armed troops formed principally from mercenaries. During the fourth century B.C. the As. of Greece underwent a very considerable change. Hitherto they had been national As., now they were to become mercenary As. The expedition of the Ten Thousand was the first expedition of a purely mercenary A.; hence the war became a trade, in which only specially trained and paid soldiers took part. The free soldiers of Greece declined more and more, until we find the mercenary element alone represented. It is necessary to notice in connection with Grecian As. the phalanx formation. This was a formation of parallel lines of soldiers drawn up in a dense and practically impenetrable mass. The early phalanx had about 6 to 8 lines of soldiers, the later development—the Macedonian phalanx—consisted of 16 columns of soldiers armed with Macedonian pikes about 24 ft. long, drawn up in close order. The Macedonian A. of Philip was probably the second standing A. of the world.

In the meantime the Rom. A. had been slowly coming to the front, and with the rise of the Rom. A. we get one of the most perfect forms of military organisation in the world. The Rom., like the Gk., was, as a citizen of the republic, bound to serve the commonwealth as a soldier. All Rom. citizens between the ages of 18 and 46 were bound to serve in the A. They received a good military training during their early military career, and for the first few years they served with the *juniores* or active A., afterwards passing to the reserve (*seniores*), where they continued their service until they reached the age limit. The richer citizens became members of the cavalry, but the greater part of the A. was composed of infantry. During the periods of active service the soldiers received pay. The A. was organised into legions, which in turn were subdivided into centuries and maniples. The sections were commanded by military tribunes, who took their orders from the consul or praetor. Up to the time of Marius the Rom. A. was recruited purely from the Rom. republic, but during the Marian regime the ranks of the Rom. A. were thrown open to the Ita., and even to peoples unconnected with the Rom. republic. The system of cohorts

was also organised by Marius. Such was the citizen Rom. A. up to the time of Augustus. By Augustus the A. was made permanent, and remained stationed on the frontiers of the empire for the purpose of guarding it. In its best days the Rom. A. excelled all others from the point of view of discipline and *esprit de corps*, but gradually the citizen A. changed. The free citizen of Rome no longer regarded it as an honour to form part of the legion; the frontier of the empire was guarded by troops stationed in one particular place and recruited from the inhab. of that country. Barbarians began to assume an important place in the legions, and gradually the power of the Rom. A. passed into the hands of the barbarian mercenaries. Not only had this a grave effect on the A. itself, but it affected very greatly also the policy of the emperors, and in the course of time the Rom. A. made and unmade its own emperors. The Rom. citizen was no longer the finest soldier in the world, but depended on the strength of the mercenaries for the defence of the empire. The decay of the Rom. citizen A. was a potent cause of the ultimate decline of the Rom. empire.

Following the fall of the great Rom. empire, we have to turn to the As. of the Teutonic tribes. These As. were essentially nations in arms. It was the privilege of the freeman to bear arms. None but a freeman could do so, and only then when he had been pronounced worthy of the honour by the 'clan.' These chieftains were invested with absolute power as long as the war continued, but this absolute power was given up as soon as peace was declared. From this system of clan warfare to one of feudal warfare was not a far step. Warriors who fought on terms of equality naturally demanded an equal sharing of the conquered ter. The chieftains divided the conquered lands amongst the warriors of the victorious As., and from this beginning we get the gradual rise of the feudal system. The discipline of the 'barbarian' As. was largely obtained from the Rom. A. Prisoners of war and deserters from the Rom. A. afterwards fought in the barbarian ranks, and in this way the discipline of Rome was rudely learnt. The As. were composed of infantry almost entirely, this infantry being divided into a light infantry which fought in conjunction with what cavalry there was, and the heavy infantry which fought in a wedge-shaped formation, and on which fell the greater burden of the fighting.

The system of 'commendation' was common amongst the Ger. tribes; the young men of good birth commended themselves to some chieftain and became his men. They formed his bodyguard in time of peace, the nucleus of his A. in time of war. Gradually this idea spread, and many small landowners commended themselves to the 'lord,' and in return for his protection rendered certain services to him. When ter. was conquered the land was divided by the lord amongst his followers, and in the course

of time he demanded as a return for these gifts an absolute supremacy over the property and persons of his followers. This was the beginning of the feudal system. Under the early Carolingian kings we have the transition period—the period when the national A., i.e. the nation in arms, and the feudal A. work together; but under the greatest of the Carolingians, Charles the Great, we find the full feudal system in force. From this time until the feudal A., the national A. disappears, and the baronial militia takes its place.

The feudal levy was the gathering together of the lord, his men-at-arms, and his other dependents and retainers. The A. was no longer composed of national levies, but was divided roughly into cavalry and infantry, which div. represented a social as well as a military difference. The lord and his men-at-arms—the cavalry—represented the nobility; the peasant and the serf—the infantry—the poor of the estate. There were many drawbacks in a feudal A.; in the first place, service was restricted. Forty days in the year to 3 months was the longest service which was given, and after that the As. disbanded. Further, no developments took place in military science; true, the barons and the knights improved their armour and their weapons, but always at the expense of the infantry, whom it was policy to keep ill armed and badly equipped. Dependence was placed almost entirely upon the heavy cavalry charge, a charge which swept all before it, until, by a development of tactics, it was shown that it could be met and overthrown by infantry and archers. Following the crusades came various battles in which new tactics were displayed and which showed that the day of the heavy cavalry charge was over. The battles of Falkirk and Bannockburn were both examples of the new development. The combination of missile and shock tactics employed by Edward III. and Henry V. showed that the feudal cavalry of France was effete. The methods of raising an A. adopted by Edward III. showed that the beginning of the end of feudal levies was in sight. Scutage had led to the employment of mercenaries. Edward III. adopted the plan of mercenaries on a large scale; kings could depend on mercenary As., and could by their aid overthrow feudalism. In the same way we get very similar developments on the Continent; the tns. are enfranchised and raise a militia which they are only too pleased to use against their natural enemies, the feudal lords. Again we find that the invention of gunpowder had a great effect on feudalism, an effect which was gradual, but which nevertheless in time led to the overthrow of feudal power. It was not for a considerable time that the making of cannon allowed the effective introduction of artillery. But when artillery became really effective it ultimately caused a revolution in the art of war. Henry V. had used artillery before Harfleur, but it was not until the end of the eighteenth

century that we can say artillery becomes really effective.

The fall of feudal As. was followed almost immediately by the rise of standing As. The earliest example of a standing A. in Europe is the formation of the famous janissary corps in Turkey, which came into existence in 1362. For a century this remained the only standing force, but after the Swiss infantry had proved that they were more than a match for the Burgundian cavalry and when Charles VII. had won repeated victories over the Eng., a standing A. was created in W. Europe. A force of about 9000 men was raised by Charles VII. and divided into *compagnies d'ordonnance*, which were to remain in existence even in times of peace; a few years later a larger force of infantry was raised by the same king. A standing A. gave an overwhelming advantage to the king; and got rid of the necessity of employing mercenaries, who were as much a disadvantage to their employers as they were a check to the enemy. This example was soon followed by other European powers, and the practice of calling out the feudal levy practically ceased from this time. With the beginning of the sixteenth century the new development went on rapidly, and soon practically all troops were armed with firearms. The method of raising a standing A. was similar to the method which had already been used by Edward III. The contracts for the raising of the A. were given to the great nobles, and in this way we get the beginning of our regimental system. The noble commanding the regiment was given a certain sum for the raising of it, and was also granted a certain sum every year for the maintenance of his regiment. At first mercenaries were very largely employed, but later the A. became to a very great extent a national and *voluntary* A. The improvement in arms led to improvements in military science, and to the development of the art of war. Under the great commanders Gustavus Adolphus and Wallenstein great changes were brought about, and instead of the *mêlée* of feudal warfare we find an organised system of military tactics which depended very largely upon the organisation of the military units.

The campaigns of Louis XIV. led to the formation of the larger divs. and brigades which form part of the modern As. Under Frederick the Great we have the beginnings of strict military training and discipline which led the Prussian troops to victory time after time when he was able to carry out his own plans, and which lessened very considerably the defeats with which he also met. The training of the Prussian infantry was due very largely to the great generalship of Frederick I., but the introduction of effective methods of shock tactics was due entirely to the great Frederick. The Fr. Revolution, however, brought with it a very essential change in the methods of raising an A. The bloody wars from which France emerged victoriously by 1797 had led to a serious draining of her resources.

In 1798 the law of conscription was brought forward and passed by Jourdan. By this law every citizen was bound to serve in the As. of France. The whole Fr. pop. between the ages of 20 and 25 was immediately enrolled, and became liable to service when called upon—the A. of France was once again to be the nation in arms. To this great scheme was due to a very large extent the success of Napoleon. It followed, then, quite naturally, that if the other nations of Europe were to keep their positions as powers they must adopt a similar plan, and at the present time all the continental powers have conscripted As.; Great Britain alone maintaining her voluntary A. until 1939 when, owing to increasing tension throughout Europe, a limited measure of conscription was introduced. From the Prussian A. came further developments; As. were raised and trained for a year, being then sent back to their homes as a reserve force, liable to be called upon when necessary. The system proved successful, and with the battle of Sadowa it proved itself so effective that the system of a reserve A. and a short-service system was taken up by practically every power. Now every nation has 3 lines of service, her standing A., her reserve A., and her second line of reserve, a militia, or similar force formed on a territorial basis.

*General Sketch of the Hist. of the Brit. A.*—The A.-S. A. was essentially a territorial militia based on the same system as the great Teutonic As., i.e. that it was the right of every free-man to bear arms in defence of his country. In England it was called the fyrd, and was not of very great use, since the terms of service were not very clearly defined, and the fyrd, except under very special conditions, would not fight outside its own territorial div. The whole system was changed by the Norman Conquest in 1066. By the end of William I.'s reign the feudal system had practically been accepted by everybody in England. On its military side it divided England roughly into 60,000 knights' fees, the holder of each of which was liable to knight's service for 40 days in the year. The feudal levy was, theoretically at least, bound to serve the king anywhere, but in fact there were many drawbacks to the system. The feudal period was barely sufficient for the crushing of a small revolt, and was ridiculous when applied to a foreign war. Gradually, as a result of the desire of the king to have a dependable A. and to crush the barons, the system of scutage (q.v.), instituted by Henry I., grew up. With the money thus obtained the king might raise mercenary troops, and so in future the idea of the king is not so much to raise soldiers from the feudal fiefs as money to obtain soldiers.

The establishment of a mercenary A. was obviously the beginning of the establishment of a standing A., but in the meantime grew up another totally different force. The militia, or, as it was originally called, the *posse comitatus*, was the levy

of all able-bodied men in the country who were liable to be called out at any time to keep the king's peace. The militia raised in this way was liable to be called out for military service at home, but not abroad, although it seems to have served from the beginning in very much the same way as the later militia, as a means of recruiting the A.

The system by means of which the Edwards raised their As., and especially the system used in the Hundred Years war, was a combination of the feudal and mercenary systems. Edward III. and Henry V. both depended entirely upon the resources of England for the men whom they placed in the field, and obtained these men by means of contracts with the great nobles and the captains of free companies, incidentally in this way solving social and economic problems. The captains of each regiment were given contracts, usually for 1 year, by which they were to maintain and arm their soldiers, and in return were to receive a certain fixed sum. The money for the soldiers was supplied from various sources, some coming from the royal revenues, some from parl. grants, some from the feudal fines paid in lieu of service. But all As. were disbanded at the end of a campaign, since the king did not then have the money by means of which they could be maintained. During the Tudor period As. were raised in a very similar fashion; under Henry VIII. we get the organisation of the yeomen of the guard and gentlemen-at-arms, these forming to a certain extent the beginning of the standing A. system.

The accession of Charles I. marks a new period, or at least the beginning of a new period. The A. becomes a source of constant trouble between the king and his parliament. By accepting the petition Charles practically declared that the king had no right to keep a standing A. in time of peace, a doctrine which was endorsed later in the great Revolution. After the Civil war the A. became the most important factor in the politics of the country; the New Model A. may well be regarded as the first Brit. standing A. Cromwell at least realised that it was impossible to fight the Cavaliers, with the whole force of military training and tradition behind them, save with a force that had some equally great object as its motive power. The result of this was the raising first of the 'Ironsides,' later of the New Model A., a regiment and an A. which were founded on the strictest principles of Puritanism. At one time Cromwell had a standing A. of about 80,000 men, fanatically enthusiastic as to the principles of the Civil war and masters of the country. The Restoration naturally led to the disbandment of this force, which could hardly have been expected to hold the confidence of the newly restored monarch, Charles II.; but with the accession of Charles II. we get the beginning of the real standing A. period. Most of the forces were disbanded, but Monk's foot regiment (Coldstream Guards) was kept, and 2 regiments of life guards were

formed from amongst the Cavalier supporters of Charles II. In addition, certain towns and fortresses were garrisoned with permanent troops maintained by royal grant. With the acquisition of territory in Africa and India we get also the formation of permanent regiments for their garrison and protection. During the reign of Charles II. there were formed at home also a few other regiments, chief amongst which may be mentioned the Royal Scots (Dumbarton's Regiment), which had seen continuous service since the ninth century, and the Buffs, which became part of the Brit. standing A. about the same time. James II. raised a standing A. which at one time consisted of 20,000 men, two-thirds of whom were stationed at Hounslow Heath in order to overawe the Londoners. In spite of the protests of Parliament, to whom he had proposed the raising of a larger standing A. in lieu of a militia, he continued to raise men, to use martial law, and to billet his soldiers on private persons. With the Revolution this ceased; James was driven from the country and his A. disbanded. William III. found himself at the beginning of his reign with his Dutch guards and a small part of James's A. as his only standing force, and the only force with which he was to repel the attacks of the exiled James. It was again necessary for the defence of the country that a standing A. should be created, and a standing A. was sanctioned by Parliament, who safeguarded themselves by assuming practical control of it and by the checks which had been placed on it by the Bill of Rights. In the first year of William III.'s reign we find that a Mutiny Act is passed which gives the Crown power to deal by martial law with all military offences such as mutiny and desertion, at the same time repeating the safeguards of the Bill of Rights and denouncing the legality of a standing A. in time of peace. The outbreak of the war of the Sp. Succession saw the raising of a large standing A., an A. which reached the dimensions of about 200,000 men, but which was immediately reduced to a peace footing after the declaration of peace at Utrecht in 1711. During the century which followed, the strength of the Brit. standing A. fluctuated between 18,000 on a peace footing and 200,000 in the middle of the nineteenth century, and on a war footing from 70,000 to 250,000 between the same dates. During the early wars of the eighteenth century the Brit. A. distinguished itself in many battles; at no time perhaps was it better than during the campaigns of Marlborough. But during the Amer. war of Independence the glory and prestige of Brit. arms waned. The early efforts of the Brit. A. during the revolutionary wars were not altogether successful, but the new organisation and training under the duke of York did much to increase its efficiency. Victories can after this be recorded almost everywhere, in Egypt, in India, and in Europe. Between Waterloo and the Crimean war the A. did not undergo many changes. Some

battles were fought in India and the colonies, but the A. rested and supported itself upon the honours which it had won in the Peninsula and at Waterloo. It was a period of stagnation and rest, a rest which was to receive a rude shock in the disasters of the Crimean war. This war opened the eyes of the country to the absolute necessity for A. reform. Between the Crimean war and 1871 England received many lessons from the continental nations. France fought in Italy in 1859, but the real lessons came from Prussia, who proved the overwhelming value of a well-trained reserve in the Seven Weeks war. The other nations realised that in order to keep on level terms their As. also must be reorganised, that the art of war must be more carefully studied, and these lessons were emphasised by the Franco-Prussian war of 1870-71. From that time the War Office received special attention from successive war ministers, and from that time dates the beginning of the short service system introduced into the Brit. A. by Mr. Cardwell in 1871.

1. *Organisation.*—The 'arms' of the A. consist of the infantry, the cavalry, and the artillery, each of which arms is able to perform some function or functions which the others cannot. These 3 main divs. are not the only divs. into arms, since there are others, such as tanks, armoured cars, cyclists, engineers, etc., but until the Second World War they formed the main body of the ordinary fighting machine. Cavalry, however, has all but disappeared from the Brit. A., and, in 1939, a Royal Armoured Corps was formed, into which were incorporated the then existing 18 mechanised regular cavalry regiments and the regular and territorial units of the Royal Tank Corps. (At this time all regiments of cavalry excepting the Royal Dragoons and the Royal Scots Greys—apart from the Life Guards—had been or were in process of being re-equipped with armoured vehicles. The relative importance of each of these arms varies in accordance with the conditions under which they are fighting, it used to be said, e.g. that in flat open country a large number of guns would be necessary, since they are able to command the enemy at a considerable distance; while in 'difficult' country infantry would preponderate, since infantry are more easily able to negotiate the difficulties caused by the physical features of the land; while in 'veldt' country, as in the Boer war, cavalry would be an absolute necessity. But experience of modern warfare, where dive-bombers and armoured units acting in close co-operation secured spectacular results on the W. front, in Poland, and in Russia, in the Second World War, suggests that this analysis requires some modification. Armoured units are, of course, only a variant of very mobile artillery, but they can be used in terrain where the movement of field guns would be difficult or slow, as e.g. in Libya. Again, infantry, unsupported by aircraft, might avail nothing against a

well-equipped invader, as, *e.g.*, in the difficult jungle country of Malaya. Finally, nowhere, except in the outmoded Polish A., or by the Cossacks, were cavalry used at all in the campaigns of the Second World War. The normal proportions of each of the 3 arms immediately prior to the First World War stood at about 5 guns and 160 cavalry to every 1000 infantry, this being, of course, on a peace footing.

It is customary to divide infantry into regiments, battalions, and companies; cavalry into regiments, squadrons, and troops; artillery into batteries which are variously grouped together; and armoured formations into brigades and companies. A lieutenant-colonel commands a battalion, which is divided into 4 companies, each commanded by a captain. The commands of general officers are the brigades of infantry, cavalry, and artillery, or the div. of more than one infantry brigade together with a force of artillery and cavalry, or the equivalent units of an armoured formation.

A brigade is the command of a brigadier or major-general, sometimes of a colonel. It usually consists of one arm only. The infantry brigade consists of 4 battalions of infantry and the necessary administrative complements, a total of about 4000 combatants. A cavalry brigade consists of 2 and sometimes 3 regiments, while a brigade of artillery is a lieutenant-colonel's command.

A div. is a body of troops consisting of all arms. It consists roughly of about 15,000 combatants, and is a general's command.

The term A. corps, signifying the organisation of a number of combatants under one commander, and consisting of divs. of infantry each supplemented by a number of brigades of cavalry and batteries of artillery, was abolished in the Brit. A. in 1906, but restored in the First World War.

The term 'an army' is applied to any organisation of troops consisting of a number of A. corps or divs. under the command of one commander-in-chief. It was held that roughly no 'A.' should consist of more than 150,000 combatants.

**War Reserves.**—Reserve troops fall into 2 divs., the regular reserve (including the supplementary or technical reserve) and the auxiliary forces. The regulars are liable to serve at any time; the auxiliary, which are represented in this country by the territorials and the special reserve, are troops which undergo a certain amount of military training, but which are not constantly under arms. These may, under certain conditions, be called upon to swell the ranks of the A. in time of war, and to go abroad on active service in a national emergency. The reserves of the active regiments rejoin their regiments and form the first line; the second line, composed of men trained but not in constant training, would undertake minor work, and later when trained under war conditions, would be drafted into the field A.

**Mutiny Act.**—The first Mutiny Act was

passed in 1689. Prior to this time the A. had been regarded as personal retainers of the king, and had been governed and disciplined by Articles of War. The passing of the first Mutiny Act gave the control of the A. into the hands of the Parliament, and incidentally, by making the Mutiny Act an ann. Act, caused the calling of ann. Parliaments. Although in many respects the Mutiny Act superseded the king's Articles of War, yet throughout the eighteenth century the Crown was allowed the prerogative of issuing Articles of War for troops outside Great Britain, and on a few occasions the Mutiny Act was allowed to expire. The Mutiny Act of 1803, while still allowing the prerogative of the Crown, at the same time so limited that power by statute that the real prerogative passed entirely into the hands of the Parliament. The Mutiny Act legislated for all serious military offences; the Articles of War was the authority for dealing with such offences. In the nineteenth century the Act and the articles were obviously not harmonising, with the result that on the recommendation of a royal commission their place was taken by the Army Discipline and Regulation Act, 1879. This Act, after being in force for 2 years, was in turn superseded by the Army Act of 1881. It is to be remarked here that the Army Act was a definitely fixed code, yet it superseded an annual Mutiny Act. This Act has been made ann. in order to emphasise the important constitutional point that 'keeping a standing A. in time of peace is illegal except with the consent of Parliament.'

The Army Act is the means by which military punishments are determined. It recites the various offences of which a soldier may be guilty, and prescribes the fitting sentence for such a crime. By it death is presented as the punishment for cowardice and treachery before the enemy, and for a number of other offences in time of war, such as desertion, or leaving a post. Death is further prescribed in peace or war for mutiny or incitement to mutiny. Offences punishable by varied terms of penal servitude follow also. The sentence of 'cashingier' may be inflicted on an officer who has been guilty of 'scandalous conduct unbecoming the character of an officer and gentleman.' Degradation, and severe reprimand, are sentences which may be inflicted upon both officers and non-commissioned officers. See further COURT MARTIAL; MILITARY LAW.

**An A. in the Field.**—At the beginning of a campaign it is necessary that the A. which is taking the field should have an adequate base of operations. The First World War made no change in this respect except in degree. In most cases it is necessary to have a maritime base, and that base, to be of any very great value, should not be too far removed from the scene of operations. This risk was appreciated in the S. African war and in the wars in Afghanistan; an inland base was necessary. In the First World War it became almost anomalous

to speak of a base in these terms; for Boulogne, the maritime base of the Brit. Expeditionary Forces, was no more than a port of disembarkation linked up with other and inland bases for supplies which were located much nearer the lines. The selection of a base must be carefully made, and it is obviously an advantage to secure one on friendly ter., since preparations are thus enabled to be carried out in anticipation of the arrival of troops. In the First World War, France being an ally, this question did not arise, but during the Crimean war it was found necessary to secure a base by force, and Balaklava was taken for this purpose. In the Second World War, Japan seized one base after another in the Brit. and Dutch possessions of the S. Pacific, including Hong Kong, Singapore, and Batavia (1941-42). When the A. moves forward it becomes necessary to establish a line of communication along which the necessary supplies, transports, etc., can move to the help of the A. in the field. Along this line of communication which connects with the base, and which is naturally carefully guarded, reinforcements may be sent to the A. in action, and the sick and wounded may be removed to the hospitals at the base. The development of air transport, however, has now made it possible to ignore lines of communication to some extent and to send air-borne troops as reinforcements to beleaguered armies. In the Russo-Ger. campaigns (1941-42) the Gers. once or twice extricated their forces from the risk of encirclement by these means. The length of the line of communication varies as the distance of the scene of war from the base, and as the length differs so does the difficulty of maintaining and guarding it. This line consists of a series of military stations connected together and with the base by means of roads and railways, sometimes waterways being used, and these military stations naturally are carefully guarded. These principles obtained unaltered in the First World War, except that they were exemplified on a much greater scale. In the presence of a hostile pop. it becomes necessary to guard every possible pregnable point in the line. The persistence of 'partisan' fighting by Russians behind the Ger. front exemplified this necessity in the Second World War. The railways have to be carefully guarded, every bridge and point of divergence must be defended by block-houses, and a column of soldiers must be kept to defend the line from the attack of the enemy, and if possible to keep the enemy away. The reserve and newly raised troops are usually kept doing the duty of guarding the lines of communication for some time before they are actually sent to the front. At certain points in the line lesser bases are constructed, where stores may be accumulated, and where temporary hospitals may be erected. In the First World War, when operations were on a vast scale, an elaborate chain of casualty clearing-stations, field hospitals, and base hos-

pitals was organised for evacuating and tending a continuous army of wounded. The evacuation of wounded by aircraft may, in certain conditions, obviate the necessity for so elaborate a chain. Along the lines of communication are dispatched from the base such supplies of food, arms, and ammunition as are necessary for the troops at the front. These are forwarded to the magazines which are nearest to the field A., and from these it draws its supplies. Further, it is very necessary that a good postal, telegraphic, and wireless service should be maintained, and whereas an already formed line of telegraphic and wireless communication may be used, often it is the duty of the base staff to create and preserve a line of communication. The intelligence dept. plays an important part in the obtaining of information for the A. in the field, but for the keeping up of direct communication by means of posts, telegraphs, heliographs, etc., the base officers are responsible.

During and since the First World War, new weapons and new organisations have given rise to many new problems. Of special importance in the training of all arms for modern warfare is the formation of a comprehensive plan of activity in attack, because success in battle depends on the proper co-ordination of all arms, since modern battles are not won by the efficiency of any one weapon, but by the combined fire effect of all arms, including bombing aircraft. In up-to-date training attention is paid to the co-ordination of the fire of artillery, machine guns, light automatics, and rifles, and to securing that the fire of artillery is brought to bear at the time and place ordered. But when the work of artillery and machine guns has been adequately planned, it is important for modern commanders in the field to remember that forward troops must still push onward, provided they are adequately covered by their own aircraft, and that a determination to advance is essential to success.

It is a commonplace that the principles of war are common sense, and that, in training, each commander must ask himself how far the action he is taking conforms to correct principles. The security of a force is the first responsibility of its commander, in which connection the importance of security, both at rest and on the move, is to be borne in mind. For this purpose, protective troops must not, either from want of vigilance or through inadequate patrolling, compromise the safety of the force they are covering. In the days of earlier experiment with armoured forces (i.e. mixed brigades of formations of infantry with machine guns, armoured cars, tanks, and 6-wheeled or semi-tracked transport wagons) before 1939, skill in driving and maintenance of vehicles, ability to secure concealment by day and night, skill in crossing rivers, dispatch in assembling after dispersion, and protection at rest were all factors which made for success in actions and, in consequence, were exercises in which a modern army had to

be trained. Co-operation with air units also became essential. The battle of Libya in 1942 fully exemplified the immense advantage the Ger. commander, Rommel, possessed in having available an adequate number of personnel skilled in repairing tanks on the battlefield itself.

Students of modern warfare prior to the Second World War were ever at pains to reconcile the real or reputed axioms of Napoleon with the changed conditions imposed by the invention of new weapons, the rapid progress of mechanisation, the perfection of field fortifications, and the development of aerial attack and reconnaissance. There was conflict between those who were mainly concerned with the *problem of attack* and those who still rested their hopes on a *war of movement and surprise*, or, in other words, those who believed that the prolonged static conditions that prevailed in trench warfare of the First World War might well be modified by the application of familiar principles through modern methods. It was clear, even without experience, that there were more ways of overcoming the enemy's army than by storming his positions, just as there were more ways of winning wars than by winning battles. The storming of positions, under modern conditions, is a costly operation and offers generally only a forlorn hope; but it was obvious that the enemy might be forestalled on positions, or forced out of them by manoeuvre, or left in them in false security while his general situation was being undermined elsewhere—which latter contingency was well illustrated in the collapse of Singapore. Modern developments were, even before the lessons of the W. front of 1940 were learned, opposed to the formation of the *continuous front* in the early phases of a war, and experts suggested that, inasmuch as mass armies did not lend themselves to *mechanisation*, it was not improbable that the earliest and most critical phase of a war might well be decided by conflicts between opposing mechanised fractions. Again, it was surmised that the concentration of masses on the frontiers might be prevented by the threat of sustained air attack on marching columns and by the threat from the same arm to the lines of communication. The development in the Second World War of the *blitzkrieg* by the Ger. A. commanders, in which the static Maginot mentality of the Fr. command suffered so humiliating a defeat, and the earlier collapse of the brave but outmoded Polish A. justified all the deductions of those who saw in modern developments of fire-power, mechanisation, and air-bombing the restoration of the *guerre de manœuvre* and the disappearance of protracted trench warfare. (See further in the campaigns described under WAR, SECOND WORLD.)

**A. Administration.**—This includes the whole of the necessary arrangements for the clothing, feeding, paying, and controlling of the A.; the methods by which an A. is raised, maintained, and generally

made efficient. In countries ruled by a sovereign the A. is nominally under his entire control, but usually now in the hands of a minister responsible to a parliament. In the United Kingdom, whereas the nominal control of the A. is in the hands of the king, in reality it is in the hands of the secretary of state for war, who is responsible to Parliament for his actions and for the advice which he gives to the sovereign. He is the head of the War Office, and is assisted by 2 under-secretaries, a permanent one and a parl. one. In 1942 2 joint permanent under-secretaries of state were appointed. The parl. secretary usually sits in the other House to that in which his chief is. Orders concerning matters regarding the fundamental agreement between the sovereign and his troops are issued by the permanent war secretary in the form of royal warrants, which are incorporated in the monthly A. orders.

Within the 20 years before the First World War much reorganisation took place in the A. After the resignation of the commander-in-chief, the duke of Cambridge, in 1895, that office was subordinated to the secretaryship of state for war. Until 1904 the office of commander-in-chief still existed, and until that period that officer controlled the military dept. of the A. The most sweeping reform at the War Office came as a result of the committee presided over by Lord Esher, which presented its report in 1904, and the bases of this reform remain virtually unchanged.

On the recommendations of that committee a permanent committee of imperial defence was formed, with the Prime Minister at its head. This committee was to consider and record all questions of military and naval defence as they affect the whole empire. On it were to sit representatives of the A. and Navy at home, of the Indian A., and of the colonies. The work of the committee was to discuss questions of imperial defence, to obtain all the necessary information for the proper carrying out of defence, and to advise on general defence questions. In addition to this committee was formed an A. Council, which consisted of 4 military and 3 civil members. The military members were the chief of the general staff, the adjutant-general, the quartermaster-general, and the master general of ordnance. Their duties were to supervise special depts. of the A. The civil members were the under-secretary for war, whose work was to supervise all civil business that did not come under the heading of finance and estimates; the financial secretary for war, who supervised all financial matters; the whole council being under the general control of the secretary of state for war. See ARMY COUNCIL.

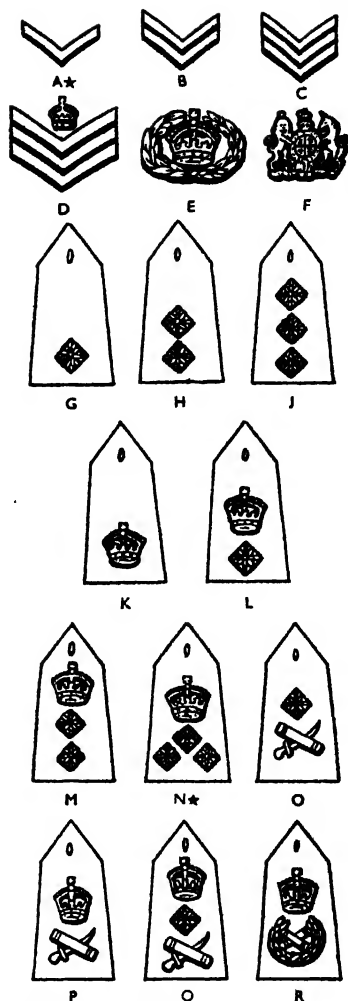
The office of commander-in-chief was abolished, and an inspectorship-general took its place. The inspector-general was to supervise the A. and to report to the council on its condition. The A.



corps system was rejected, its place being taken by administrative districts. In 1909 followed Lord Haldane's scheme, by which the volunteer A. was replaced by a territorial one, on the basis of co. associations. The militia was superseded by a special reserve which enlisted for 6 years, thus bringing it about that a regular A. would always be ready for foreign service.

**Mechanisation.**—The most striking development in the modern A. is the process of mechanisation. Modern tanks (heavy, medium, and light), for instance, are very different from the old machines which played so dominating a part in the First World War; tractors for artillery (the 'Hathi'); armoured cars; track and semi-track and 6-wheeled vehicles for transport are all factors in the metamorphosis of the present-day A. Field brigades of Artillery have been mechanised (i.e. tractor-driven). Consequent on this change, the administrative duties as to the design, provision, and repair of transport and technical vehicles as between the departments of the quartermaster-general and the master general of the ordnance were in 1927 re-allocated so as to throw the sole responsibility on the latter except as regards vehicles of the R.A.S.C.

**Reorganisation Scheme of 1935.**—Profound changes in the organisation of both cavalry and infantry, involving conversions of regiments of both these arms, were decided upon by the War Office at the end of 1935. As a result of this decision only the Household Cavalry, the Royal Dragoons, the Scots Greys, and a few Indian regiments retained horses. The object of this remodelling scheme was to make the Brit. A. a swifter and more up-to-date fighting force, and, to that end, it was decided, as regards the cavalry arm, (1) to convert the cavalry div. (which consisted of 2 horsed brigades and divisional troops) and the Tank Brigade into a mechanised mobile div. This div. before 1939 consisted of 2 mechanised cavalry brigades, each consisting of 2 motor cavalry regiments and 1 cavalry light tank regiment, the Tank Brigade, and divisional troops; and (2) to convert the cavalry brigade in Egypt into a mechanised formation consisting of 1 armoured car regiment, 1 motor cavalry regiment, and 1 cavalry light tank regiment. The mechanised cavalry units were subsequently divided into (a) cavalry armoured car regiments; (b) motor cavalry regiments; and (c) cavalry light tank regiments. The following famous regiments were converted and thus disappeared as cavalry: 1st King's Dragoon Guards, Queen's Bays, 3rd, 4th, 7th, 8th, and 10th Hussars, and 9th Lancers. Among those that remain horsed are the Life Guards and the Blues or Household Cavalry—largely for ceremonial purposes. It is obvious that the retention of the word cavalry for other than horsed regiments was a misnomer, but clearly designed in the interests of the traditions and precedence of the converted units.



BADGES OF RANKS AND APPOINTMENTS  
(★) IN THE BRITISH ARMY

A★, lance-corporal; B, corporal; C, sergeant; D, staff-sergeant; E, warrant officer, 2nd class; F, warrant officer, 1st class; G, 2nd lieutenant; H, lieutenant; J, captain; K, major; L, lieutenant-colonel; M, colonel; N★, brigadier; O, major-general; P, lieutenant-general; Q, general; R, field-marshal.

The Royal Armoured Corps of 1939 incorporated all the then existing 18 mechanised regular cavalry regiments, besides the regular and territorial units

of the Royal Tank Corps. The cavalry regiments retained their then-existing designations. As regards the infantry arm, the scheme affected all the regular battalions, which became either machine-gun battalions or rifle battalions in order to provide infantry brigades consisting of 3 rifle battalions and 1 machine-gun battalion each. Machine-gun battalions were, however, to comprise anti-tank weapons, and to constitute the heavy infantry support battalions of the A. The rifle battalions were to be equipped with the new light machine gun. Two battalions of the Foot Guards and 13 regiments of infantry of the line became machine-gun units. The remaining (Guards battalions and line regiments were rifle battalions).

The lessons learned in the First World War spelt the doom of the cavalry and pointed also to the necessity for a far more adequate complement of machine guns and other supporting arms for the rifle battalions. The horsed cavalry lacked the speed, wide range of action, and striking power required of mobile troops fighting under modern conditions in which mechanised troops are employed. Moreover, the Tank Brigade required the co-operation of equally mobile troops who could act in areas and under conditions unsuitable to tanks. Thus, the Mobile Div. was so organised as to supply this co-operation. The new organisation for infantry brigades was designed to secure a better tactical co-ordination of infantry weapons, while simplifying modern developments in armament and equipment—these having become ever more complex by reason of the introduction of anti-tank guns, armoured machine-gun carriers, and so forth. In short, this reorganisation not only involved the complete remodelling of a considerable number of cavalry and infantry regiments, but it meant that the system of strategy and tactics on which the training of the Brit. A. was based had been revolutionised.

**Scientific Adviser.**—The A. Council in 1942 appointed a scientific adviser, whose main function was to carry out research in response to the demands of the War Office directorates and branches. His purview was not confined solely to new weapons and equipment but extended also to the examination and improvement of those already existing. In 1946 the A. Council decided that this post should be maintained in peace. The adviser has a permanent establishment in the War Office and also outside it, in the commands and overseas. The questions he deals with may be put under the heads: weapons, logistics, and the soldier in relation to personal equipment and physical and moral endurance. Within the A. organisation the scientific adviser's closest military collaborator is the director of tactical investigation, who is a regular officer and whose duty it is to study the application of the results of scientific research to the use of the A., to examine the information coming in from

our own and hostile sources, and to advise on the tactical employment of new weapons and equipment. This officer works under the director of military training, but maintains touch with scientific matters through the scientific adviser.

**Commandos.**—The name given, during the Second World War, to special units of the British Army, trained for use as raiding parties on hostile shores. A large number were trained as parachutists. Commando raids in Norway and on the French coast were often strikingly successful.

**Commissions.**—As a general rule, officers for the post-war regular A. are provided from candidates who have served for a period in the ranks. The normal avenue of appointment to a regular commission is after training at an A. college, though a proportion of candidates are obtained by direct entry from the univs. and from the auxiliary forces. The normal age for entry to the A. college is 18½ to 19 years; the course at the college is for 18 months and is designed to give a general education with a definite military bias. No fees are payable at the college, which the cadets attend as enlisted soldiers. Candidates are commissioned at the end of the college course, following which those accepted for the technical arms are given a further professional training in science and engineering. Subject to vacancies and to the needs of the A. as a whole, the preferences expressed by cadets are studied in deciding to which corps or regiment a cadet is commissioned. Candidates for the A. college are normally selected on the results of an A. entrance examination, comprising a written educational part together with tests of character and personality. Candidates who have taken the higher school certificate are normally exempt from taking the written part of the examination. In addition, a proportion of the vacancies at the college are allotted to specially selected candidates under-going compulsory A. service or serving on regular attestations; such candidates are not required to take the entrance examination, but are selected for their all-round qualities of leadership, subject to attaining a standard of general education enabling them to undertake the A. college course.

**A. Pay.**—The system and rates of pay of members of the 3 forces below officer rank were reviewed in 1945 (Cmd. 6715) so as to simplify the system and fix rates which should compare reasonably well with civilian rates in gov. industrial establishments. The A. now has a common pay scale in the ranks of corporal and below for all men, whether they are tradesmen or non-tradesmen, the progression of both classes being governed by the award of 'stars' for qualifications attained. There are now only 4 separate rates of pay for privates and 2 for sergeants and those above that rank. The weekly rates are as follows:

	1-Star	2-Star	3-Star
	s. d.	s. d.	s. d.
Private	35 0	42 0	49 0
Lance-Cpl.	38 6	45 6	52 6
Corporal	52 6	59 6	66 6
Sergeant	73s. 6d. and 84s. 0d.		
Staff Sergeant	84s. 0d. and 101s. 6d.		
Warrant Officer II	91s. 0d. and 103s. 0d.		
Warrant Officer I	105s. 0d. and 119s. 0d.		

Increments of 3s. 6d. a week are granted at 5 and 10 years' service to all soldiers; to corporals, sergeants, and W.O.II after 4 years' service as such; and of 10s. 6d. a week to W.O.I after each 4-year period.

Additional pay is granted for certain duties in the air, including parachute duties; but otherwise, with minor exceptions, extra pay for special duties and qualifications is absorbed in the basic rates.

The normal regular engagement is now for 5 years with the colours, but extensions to complete 12 years are granted on a more liberal scale than before the war. Men with service so extended have the right to re-engage to complete a pensionable engagement, which, subject to the necessary legislation, is 22 years, and continuance beyond that period is permissible in certain cases.

The new rates represent a considerable increase on the pre-war rates, particularly for the soldier who is not a tradesman, and very much more than the previous rates of basic pay. The recruit who on entry received 14s. a week before the war, and subsequently 21s., now has 28s. The trained infantryman whose pay before the war was 21s. a week, and subsequently 31s. 6d., now has 42s. a week. Under the new code of pay there is a flat rate of marriage allowance for all married men of the same rank. The basic rate is 35s. a week, with higher rates for men of the rank of sergeant and above. Children of service men are eligible, in common with children of civilians, for the allowances provided by the Family Allowances Act. A new basic scale of pension (common to all 3 services) for men completing 22 years' service, with a higher scale for longer periods, was introduced by the new code. In general, the new scale is considerably higher than the old scale (1930). The code also brought in a new scheme of gratuities for men discharged or transferred to the Reserve without being eligible for service pension, on completion normally of not less than 10 years' service. The maximum gratuity is £200 for 15 years' service.

The post-war code of pay, allowances, retired pay, and service gratuities for commissioned officers was introduced in Mar. 1946 (Cmd. 6750). The new schemes are designed primarily for the post-war regular officer, but the new rates of pay and allowances in fact apply to all officers of the main classes, executive, technical, and administrative, as from July 1, 1946.

Certain special categories of officers, including the medical and dental services, chaplains, officers on legal and educational duties, officers of the Royal Marines, men commissioned from the ranks at relatively late ages or for limited duties, officers on Indian rates of pay, officers of the nursing and women's services, are outside the scope of this code. The new schemes of pay, allowances, retired pay for officers are founded on the same general principles as for other ranks (set forth in Cmd. 6715 above). The various systems and rates of marriage allowances and other allowances are replaced by common systems with common rates for all 3 services, and there is also a common code of retired pay and service gratuities. There is, however, a system of qualification pay for officers of the rank of major and below with not less than 2 years' commissioned service. Qualification pay is not granted for the qualities or degrees of knowledge required by an officer to carry out the normal duties of his corps, but for military and technical qualifications obtained by a proportion of specially qualified officers, e.g. officers who have qualified at the staff college, or who possess a university honours degree in a subject of value to the A. This qualification pay is, for a Lieutenant, 2s. 6d. a day, Captain, 4s., and Major, 5s. The separate allowances for lodging, fuel and light, furniture, and servants, often at varying rates under the old system, have been replaced by a common composite lodging allowance (or in the case of married officers living with their families, by marriage allowance), which varies only with rank. Pay for an officer has now been fixed at a level which, it is assumed, enables him to live without private means. As in the case of other ranks, officers are given, under the new code, a flat-rate system of marriage allowance, taking account only of rank and not of the size of family. The qualifying age for marriage allowance was reduced from the pre-war limit of 30 to 25. The table on p. 512 shows the total annual emoluments for married officers (excluding rations or ration allowance, and any other allowances except marriage allowance).

The full standard rates of retired pay are: Captain, £375 a year; Major, £475; Lieut.-Colonel, £625; Colonel, £825; Brigadier, £900; Major-General, £1100; Lieut.-General, £1300; General, £1500; Field-Marshal, £1800. The grant of retired pay, to officers retired otherwise than as invalids, is normally conditional upon completion of 20 years' service, but where in special cases, in the interests of the service, officers are entered at ages above that of the normal entrant, retired pay may be granted on compulsory retirement after not less than 15 years' service. For invalided officers retired pay is admissible provided that not less than 10 years' service has been given. Gratuities are payable to officers holding permanent commissions who on retirement have not completed sufficient service to qualify for retired pay. The gratuity is £1000 on completion of not less than 10

years' service, and £150 for each complete year of service in excess of 10 years. The maximum total gratuity payable is £2350. Where an officer is permitted to leave the service, except on invaliding, after less than 10 years' service, no gratuity is payable.

Years of service	Expected age	Rank	Basic Pay†	Marriage allowance	Total
4	25	Lt. (at 2 years)	£ 310	£ 228	£ 538
5	26	"	347	228	575
6	27	Capt.	420	228	648
8	29	"	456	228	684
10	31	"	492	228	720
12	33	"	529	228	757
13	34	Major	639	228	867
15	36	"	675	228	903
17	38	"	712	228	940
19	40	"	748	228	976
Less than 19	—	Lt.-Col. (promotion by selection)	867	274	1141
19	40	"	912	274	1186
21	42	"	958	274	1232
23	44	"	1004	274	1278
25	46	"	1049	274	1323
Colonel on appointment			£ 1186	£ 274	£ 1460
" after 2 years			1241	274	1515
" " 4 "			1296	274	1570
" " 6 "			1350	274	1624
Brigadier			1405	319	1724
Major-General			2007	365	2372
Lieut-General			2463	365	2828
General			2920	365	3285
Field-Marshal			3285	465	3650

† Qualification pay may be payable in addition.

**Reserve Forces.**—The pre-war A. Reserve numbered about 115,000 men (1939). In 1924 a Supplementary Reserve was created for the purpose of giving to the A. on mobilisation an adequate number of technicians or 'tradesmen.' Its peacetime strength is 25,000. There is no Militia in the old sense. The designation Militia was revived in 1922 for the Special Reserve, recruiting for which was never begun. In 1922 a departmental committee considered the question of reviving the old Militia. Upon their findings the A. Council decided to abandon the resuscitation as unnecessary and uneconomical. In 1939 the name militia was given to the new conscript army of men of 20 years of age. The Territorial Force was reconstituted in 1920 as the Territorial A., equipped as a second line to the Regular A. and with acceptance of a foreign service obligation. Its strength was 160,000 in 1938. In 1939 it was decided to raise its establishment to 730,000. In that year the Territorial A. ceased to have an independent exist-

tence and was merged in the Regular A. (Armed Forces—Conditions of Service—Act, 1939). A local defence volunteer force was formed early in 1940 in view of the threat of a Ger. invasion. This was later renamed the Home Guard, and in 1941 the compulsory principle was introduced for areas where the numbers were insufficient under the voluntary system. A women's corps, called the A. Territorial Service, was also formed during the war, in order to release men for the combatant ranks. Their duties included transport, and work on searchlights and gun stations.

**Educational Training.**—Education of the rank and file has made considerable progress. In 1920 the A. Educational Corps was formed to train officers for educational work in the A. This corps was formed to train officers for educational work in the A. This corps absorbed the old Corps of A. Schoolmasters. Many first-class certificates (Eng., map-reading, arithmetic, geography) are awarded annually, a number of special certificates (equivalent to matriculation). There is also provision at 3 centres, Hounslow, Chisleton, and Aldershot, for vocational training. At these centres a limited number of soldiers in the closing months of their colour service are taught some useful trade. See also TANKS, TERRITORIAL ARMY. For foreign As. see under foreign countries. See J. S. Ormond, *Parliament and the Army, 1612-1904*, 1933; D. H. Cole and E. C. Priestley, *An Outline of British Military History, 1937*; J. K. Dunlop, *The Development of the British Army, 1899-1914*, 1938; C. C. P. Lawson, *A History of the Uniforms of the British Army to 1760*, 1939-41; Cyril Falls, *The Nature of Modern Warfare*, 1941; S. L. A. Marshall, *Armies on Wheels*, 1942; W. G. Lindsell, *Military Organisation and Administration*, 1943.

**Army-worm**, or *Leucania unipunctata*, is the larva of an insect of the order Lepidoptera and family Noctuidæ, which receives its name from its habit of marching in great numbers. It does much damage to Amer. crops. The final stage of its life occurs when it becomes a nocturnal moth.

**Arnaldus de Villa Nova**, see ARNOLDUS. **Arnatta**, see ANNOTTO.

**Arnaud, Arsène**, see CLARETIE, JULIE.

**Arnaud**, or **Arnauld**, or **Ernoldus** (d. c. 1156), the abbot of St. Florentin de Bonneval, and a friend of the great St. Bernard. During the greater part of his lifetime he kept up a correspondence with St. Bernard, whose life he afterwards partly wrote.

**Arnaud, François Thomas Marie de Baculard d'** (c. 1718-1803), Parisian writer and dramatist. He was b. in Paris, where he also d. For some time his literary merit attracted the attention of Voltaire, by whom he was recommended to the king of Prussia. He was for a time at the court in Berlin, but returned to Paris the year before the outbreak of the Seven Years War (1756). During the latter part of his life he lived a life of great poverty and misery. His

chief works are *Les Délassements de l'homme sensible*, *Les Loisirs utiles*, and a number of romances and sacred odes.

**Arnaud, Henri** (1641-1721), pastor and general of the Vaudois of Piedmont, was b. at Enibrun. He was educated at La Tour, and later at the college at Basle and the academy at Geneva. He was in the course of time appointed pastor at the vil. of La Tour. After the expulsion of the Vaudois by Victor Amadeus he became their leader, and probably visited William of Orange in order to obtain help and money. The revolution of 1688 in England gave A. encouragement, and he led the expedition which was to attempt 'la glorieuse rentrée.' After encountering almost unsurpassable difficulties, they were besieged during the whole winter by the Fr. and the Savoyards; but they were forced to retreat and were driven to a valley above La Tour by A. In the following month they were received into favour by the duke of Savoy, who had become an ally of William III. For the next few years A. and the Vaudois helped the allies to fight the Fr. But at the end of the war, the duke again becoming hostile, they were forced to leave the country, and about 3000 of them followed A. into exile in Protestant countries, mainly in Germany. Again the Vaudois, during the war of the Spanish Succession, helped the allies against the Fr., but A. did not fight in person this time. He visited England about 1707. He died at Schonenberg. During his exile he wrote his *Histoire de la glorieuse rentrée des Vaudois dans leurs vallées*, which was trans. into Eng. in 1827.

**Arnaud de Cervole** (d. 1366), a brigand chief who commanded one of those bands which ravaged the S. of France during the thirteenth and fourteenth centuries. He fought with King John at Poitiers in 1356, and with him was taken prisoner. After his release he again returned to the S. of France and exerted his old influence over his band. He pillaged the whole of S. France, and held Pope Innocent VI. to ransom. He again took service with the royal army, and defended Burgundy against the Free Companies; but at the same time he gave it up to his own soldiers to pillage. He was assassinated by one of his followers.

**Arnaud de Villeneuve**, see **ARNOLDUS**.

**Arnaud**, or **Ernoldus**, see **ARNAUD**.

**Arnaud, Angélique de St. Jean** (c. 1624-1681), a nun at Port Royal. She was elected prioress in 1673, and was by her piety and courage an example to all the sisters during the Jansenist persecutions. She was elected abbess in 1678, and retained that position until her death. To her we owe the *Mémoires pour servir à l'histoire de Port Royal* and literary pictures of her 2 famous aunts.

**Arnaud, Antoine** (1612-94), the twentieth and youngest son of Antoine A., a famous Fr. lawyer. He is usually distinguished by the name 'le grand A.' He was originally intended for the bar, but chose rather the study of theology. He became a Jansenist, and his book, *De la*

*fréquente communion*, raised such an uproar that he was forced into hiding for 20 years, and his letters, *A un duc et pair*, a very outspoken attack on Jesuitical methods, were the immediate cause of the famous *Lettres provinciales* of Pascal, but these failed to save A. from being solemnly expelled from the Sorbonne and degraded, 1636. The 'Peace' of Clement IX. suspended attacks on Jansenism, and A. emerged from retirement, and was graciously received by Louis XIV. In his *La Perpétuité de la foi* he now defended transubstantiation and attacked the Calvinistic doctrines. His submissions proved external only and Port Royal became a Jansenist centre. This doctrine was condemned by Pope Alexander VIII. in 1690, and A. once again went into exile and fled to Holland before the storm burst. There he conducted controversies with Jesuits, Protestants, and even with Malebranche. His *Art de penser* (*Port-Royal Logic*), in collaboration with Nicole (q.v.), remained as a text-book until quite recent times.

**Arnaut, Antoine Vincent** (1766-1834), was b. in Paris. Almost immediately after starting his dramatic writings he was successful with his play *Marius à Minturnes*, 1791. He left France during the Terror, but returned and was arrested, and for a short time imprisoned. He was patronised by Napoleon and remained faithful to him during the Hundred Days. Because of this he remained in exile until 1819. Ten years later he was again elected to the Academy, and in 1833 became secretary. Among his works may be mentioned *Blanche de Montcassin*, *Fables*, and *Souvenirs d'un sexagénaire*.

**Arnaut**, a Turkish and Serbian word meaning a native of Albania; an Albanian.

**Arnaut Daniel**, one of the most famous of troubadours. His name remains to us as the name of the greatest of troubadours, owing to the praise bestowed upon him by Dante. He seems to have been a knight of Périgord, who attached himself as a troubadour to the court of King Richard I. of England. He was a great composer of the love song, and both Dante and Petrarch are loud in their praises of the *sestina*, a poetic form which he invented. His versification is complicated and to-day it is difficult for us to understand the admiration which it once excited.

**Arnaut de Mareuil**, a troubadour of the S.W. of France who settled at the court of Toulouse. By his passion for the Countess Adalasia he roused the wrath of his rival Alfonso II. of Aragon and was forced to flee into exile. He probably d. before the end of the twelfth century.

**Arndt, Ernst Moritz** (1769-1860), Ger. poet and patriot. He was the son of an emancipated serf, and was educated at Stralsund, Greifswald, and Jena. Intended for the ministry, he renounced it, and led for some time a wandering life. He 1803 he pub. *Versuch einer Geschichte der Leibeigenschaft in Pommern und Rügen*, a hist. of serfdom which led to its abolition in 1806 in Pomerania. In 1806 he issued the famous call to the Gers. to

throw off the yoke of France, and such excitement did it produce that he was forced into exile in Sweden to escape Napoleon. In 1810 he issued pamphlet after pamphlet full of hatred of the Fr., and issued also his famous songs, *Was ist das Deutsche Vaterland?* and *Was bliesen die Trompeten?* In 1818 he was appointed to the univ. at Bonn, and threw himself into the movement for constitutional reform. He was arrested and imprisoned for a short time because of the boldness of his demands, and was not reinstated as prof. until 1840. He was elected to the Ger. Diet in 1848, but resigned in 1849.

**Arndt, John (Johann)** (1555-1621), a Lutheran divine, b. at Ballenstädt in Anhalt. He studied theology under the tutelage of Lutheran teachers. His most famous work is his *Wahres Christenthum* (True Christianity). In this he points out Christ's life in His people as contrasted with the main Lutheran doctrine. His death for His people. His works are mainly of the mystical and devotional kind.

**Arne, Thomas Augustine** (1710-78), the son of an upholsterer, was b. in London, and educated at Eton. He was intended for the bar, but his love for music decided his career. In 1733 he produced his first opera, *Rosamond*, in which his sister Susanna Maria, afterwards the famous Mrs. Cibber, took the prin. part. He wrote music for Fielding's *Tom Thumb*, Congreve's *Judgment of Paris*, Milton's *Comus* and Thomson and Mallet's *Masque of Alfred*. In the last-named appeared the famous *Rule, Britannia*. In 1744 he was appointed composer to the Drury Lane theatre. In 1746 he supplied music for the masque and the song *Where the Bee sucks in The Tempest*. He composed 2 oratorios, *Abel and Judith*. He was made a Mus. Doc. in 1759. He afterwards became famous as a music teacher. He was buried at St. Paul's, Covent Garden.

**Arnes**, native name of the *Bos bubalus*, or *Bubalus arni*, a buffalo found in the W. Indies. It has large horns and is of great size.

**Arngrim, Arngrímur Jonsson** (1568-1648), Icelandic scholar, surnamed the Learned. The priest of Mel. He wrote *Brevis Commentarius de Islandia*, 1593; a *Supplementum*, on the lives of the kings, 1596; the *Crymogæa*, 1610; and *Specimen Islandiæ*, 1643. See Vigfusson and Powell's *Corpus Poeticum Boreale*, 1883.

**Arnheim, Johann Georg**, see ARNIM.

**Arnhem**, cap. of the prov. of Gelderland, Holland. Situated on the r. b. of the Rhine about 35 m. E.S.E. of Utrecht. Its surroundings are extremely beautiful. Its chief manufs. are cotton and woollen goods, soap, carriages, and tobacco. Sir P. Sidney d. here in 1586. First Allied Airborne Div. landed here Sept. 17, 1944. After 9 days' heroic stand 2000 men were brought back, with heavy losses to the div. on Sept. 26. Brit.-Canadian troops captured A. Apr. 13-14, 1945. See WESTERN FRONT IN SECOND WORLD WAR. Pop. 96,000.

**Arnhem Land**, the name given to a por-

tion of the extreme N. of S. Australia; taken from the name of the ship on which the voyage of discovery to this land was undertaken in 1618.

**Arni**, see ARNEE.

**Arnica**, a genus of Compositæ found in cold and temperate climates. *A. montana*, the leopard's-bane, common to Alpine woods, contains an acrid resin and a volatile oil.

**Arnim, Bettina von** (1785-1859), a Ger. authoress, the sister of Clemens Brentano. In 1807 she made the acquaintance of the poet Goethe, for whom she had a great attachment. The acquaintance, however, came to an abrupt end in 1811, owing to her deliberate insolence to Goethe's wife. She married in 1811 the writer Ludwig von A. (q.v.). Her most famous publication was the *Goethes Briefwechsel mit einem Kinde*, 1835. This purported to be a correspondence between herself and the poet, which was at first believed to be authentic, but was later proved to be grossly interpolated and to a great extent fictitious. See on this Lewes's *Life and Works of Goethe*, 1855. A number of her books are equally unreliable.

**Arnim, Harry Karl von** (1824-81), b. in Pomerania, and brought up by his uncle Heinrich von A., who had been ambas. at Paris and foreign minister. In 1864 he was appointed Prussian envoy at the Vatican. In 1869 he pointed out the difficulties which would arise practically if papal infallibility were allowed to be promulgated. In 1871 he was Ger. commissioner at Paris, and in 1872 he was appointed ambas. He quarrelled with Bismarck, and on a charge of embezzling state papers was sentenced to 3 months', and, on appeal, 9 months' imprisonment. For publication against Bismarck, while in exile, he was sentenced to 5 years' imprisonment. He d. while on his return from exile.

**Arnim, or Arnheim, Johann Georg** (1581-1641), Ger. diplomatist and general, b. at Boltzenburg; served under Gustavus Adolphus in 1613, and in the Polish army, and in 1626 entered the imperial service under Wallenstein. In 1630 he left it for that of the elector of Saxony, and commanded part of his army at Breitenfeld in 1631. He assisted in the negotiations between the elector and Wallenstein during 1633-34; and defeated the Imperialists under Colloredo at Liegnitz, 1634. D. at Dresden while leading the Imperial and Saxon forces against the Fr. and Swedes.

**Arnim, Ludwig Achim von** (1781-1831), a Ger. poet and novelist who was b. at Berlin. He received a scientific training, but his natural tendency was towards literature with a fondness for romance and the supernatural. This is seen in his *Ariels Offenbarungen* and *Hallins Liebesleben* (both pub. in 1804), the latter containing a biography of Rousseau. He collected old popular legends and songs in travelling through Germany, which he pub. in collaboration with Clemens Brentano, in 3 vols., entitled *Des Knaben Wunderhorn*, 1806-8. In 1809 appeared the *Wundergarten*, a collection of tales,

Other works were *Die Gräfin Dolores* (a novel), 1810; *Itale und Jerusalem* (dramatic romance), 1811; and *Isabelle von Ägypten*, 1811. In 1817 he pub. his last notable romance, *Die Kronenwächter*. His works show a gift for invention, but his style is whimsical and incoherent.

**Arnim, Mary Annette, Countess von** (later Countess Russell), authoress, a daughter of H. Herron Beauchamp. She married Count August von A., who d. in 1910. She won popularity with *Elizabeth and her German Garden*, 1818. Her other works include *The Benefactress*, 1901, *The Caravaners*, 1909, *The Adventures of Elizabeth in Rugen*, 1901, *Christopher and Columbus* (a war-time story), 1919, and *Expiation*, 1926; all of them show an acute and lively wit. In those of her works that belong to the 'Elizabeth' series, as well as in others, a frequent theme is the reaction of Ger. and Eng. temperaments upon each other; and in *Christopher and Columbus* she proved herself at home with Amers. in their own land. She became third wife of the second Earl Russell in 1916, but they separated in 1919. Her later novels included *The Enchanted April*, 1922, and *Introduction to Sally*, 1926. She d. in 1941.

**Arnim, General Sixt von** (1851-1930). Ger. general. In the final Ger. offensive, begun Mar. 1918, he commanded that one of the 7 armies which occupied the line from the sea to the R. Lys. His objective was, in conjunction with Gen. von Quast, commanding from the Lys to Arras, to thrust back the Brit. First Army under Gen. Horne upon the Brit. armies which were in retreat to the Aisne and so isolate the Second Army under Gen. (later F.M.) Plumer. He took Mont Kemmel (Apr. 24-26) by violent frontal and flank assaults, but his losses were so severe that he was unable to secure other hills belonging to the same system, and so could no longer jeopardise Ypres. This failure, together with that at Hazebrouck, was the beginning of the end of the great Ger. thrust of 1918.

**Arno**, one of the most important rvs. in Italy. It rises on Mt. Falterona in the Apennines, about 25 m. N. of Arezzo. It is about 140 m. long, and enters the Mediterranean at Leghorn, a few m. S. of the tn. of Pisa. It flows through Florence, where it attains a width of about 400 ft. It is navigable for barges as far as Florence, except in the summer, when it is fordable. It is joined to the Tiber by the Chiana canal. Brit. Eighth Army entered Arezzo July 16, 1944. S. Africans reached outskirts of Florence, Aug. 1; when 6 bridges over the A. were found to be destroyed. Florence was taken by the Allies on Aug. 11. The Fifth Army took Pisa on Sept. 1. See ITALIAN FRONT IN SECOND WORLD WAR.

**Arnobius** (d. 327), a teacher of rhetoric in Numidia who fl. during the late third and early fourth centuries. He was brought up as a pagan, but became a Christian, probably about the year 300. In the first decade of the fourth century he pub. the work *Adversus Nationes*, for

which he is chiefly remembered. The work was a bitter and ironic attack on paganism.

**Arnold**, tn. and par. of Nottinghamshire, England, 4 m. N.E. of Nottingham, in Sherwood Forest. Has manufs. of lace and hosiery. Pop. 11,800.

**Arnold da Brescia** was a native of the tn. of Brescia, and one of the most prominent opponents of the temporal power of the papacy. He was b. probably towards the end of the eleventh century, of noble parents. Educated in Paris, it is probable that he came into contact with Abelard, even though he may not actually have been taught by him. On his return to Italy he became a canon regular, and was noted for his extreme asceticism. Accused by St. Bernard of being a follower of Abelard, he shared Abelard's condemnation in 1140. He attacked St. Bernard, and as a result was forced to flee from France owing to the influence of his opponent. He took refuge at Zurich, where he remained for 5 years. On his return to Rome (1145), A. joined the republican movement, of which, before long, he became the most prominent leader; he made continual attacks upon the clergy, vehemently denying their right to hold property. For 10 years this state of disorder continued. Even on the return of the pope to Rome in 1148, A. remained undisturbed; but on the accession to the papacy of Adrian IV. (Nicholas Breakspear), and the accession to the imperial throne of Frederick Barbarossa, A. was forced to flee into Campagna. Here he was seized and brought to Rome, 1155. In Rome he was condemned, hanged, and burnt, and his ashes were thrown into the R. Tiber.

**Arnold von Bruck** (d. c. 1536), a celebrated musician who fl. at the beginning of the sixteenth century. His bp. is unknown. He lived for some considerable time in Germany, and received an appointment as music master in the chapel of Ferdinand, the brother of the Emperor Charles V., and was dean of the abbey of Lulbach. He composed a great deal of sacred music. He d. at Vienna.

**Arnold of Winkelried**, a Swiss knight and hero of the Unterwalden. During the struggle for independence by the Swiss freemen and peasantry against the Austrian archduke, a battle was fought at Sempach, a small vil. some few m. distant from Lucerne, in July 1386, the Austrians being led by their archduke, Leopold. The Austrians, who numbered about 4000, were opposed by 1500 Swiss. The Swiss struggled heroically against the Austrians, but could make no impression upon the phalanx of heavily armoured pike-bearing soldiers. A. of W., seeing that the only way to defeat the Austrians was to open a way through their ranks, rushed upon the spears, and grasping a number of the long pikes in his embrace, cleared a road for his companions in arms over his dead body. At close quarters the Austrians, hampered by their armour, were annihilated, and the independence of Switzerland was won.

The anniversary of the death of A. is still observed as a Swiss festival.

**Arnold, Benedict** (1741-1801). Every Amer. school child is taught to loathe the name of A. as the classic example of the traitor to his country. B. in Connecticut. A. joined the Amer. Army in the war of Independence and distinguished himself in the battles of Ticonderoga and Quebec. He reached the rank of major-general and was one of the most trusted officers of Gen. Washington. Subsequently, he became aggrieved at the promotion of sev. inferior officers over his head. But he continued at his post, fought at Ridgefield and Saratoga, was commander at Philadelphia in 1775 and then put in charge of the all-important post of W. Point on the Hudson R. in 1780. By that time his resentment had so rankled that he was ripe for treachery and entered into communication with the Brit. command for the betrayal to them of his post. A handsome young Brit. officer, Maj. John André, was sent to meet him. André was captured and hanged as a spy, but A. escaped to the Brit. lines, where he received a command and fought against his fellow countrymen. He sailed for England in 1782 and d. in London June 14, 1801, where he lived more or less in obscurity, a disappointed and embittered man.

**Arnold, Sir Edwin** (1820-1904), Eng. poet, b. at Gravesend, son of a Sussex magistrate, and educated at King's School, Rochester, King's College, London, and Univ. College, Oxford. At the latter place he gained the Newdigate prize for a poem on Belshazzar's feast. He went to India as a schoolmaster, and during the mutiny was able to render signal service to the Gov. Later he became a journalist, and was on the staff of the *Daily Telegraph* (of which he was ultimately editor), and it was he who was largely responsible for the dispatch of Stanley to the Congo. He is, however, best remembered as a poet. His most famous poem is *The Light of Asia* (1879), an epic poem on the life and teachings of Buddha. In *The Light of the World* (1891) he attempted, less successfully, a similar treatment of the life and teaching of Jesus. Amongst his other works are: *The Song of Songs of India*, 1875; *The Song Celestial*, 1885; *With Sa'di in the Garden*, 1888; *Adzuma*, 1893. He was made a C.S.I. in 1877, and K.C.I.E. in 1888.

**Arnold, Matthew** (1822-88), b. at Laleham, Middlesex, on Christmas Eve. His father was the famous headmaster of Rugby School, to which establishment M. A. went to finish his education. From here, having obtained a scholarship at Balliol, he went on to Oxford in 1840. Even at this early time his mind had already turned to literature, and his poem, *Alaric at Rome*, had been recited in Rugby School in 1840. In 1843 he obtained the Newdigate prize with a poem on Cromwell, but *Cromwell* does not give one as good an impression as his earlier poem on Alaric. In the following year he took his degree, and a year later was

rewarded with a fellowship at Oriel College. After leaving the univ. A. for a short time taught classics to the fifth form at his father's old school, but he did not long remain a schoolmaster. In 1847 he became private secretary to Lord Lansdowne, then a leader of the moderate Whigs, and on him A., to a large extent, modelled his politics.

In July 1849 appeared the first of A.'s pub. sonnets, and in the same year appeared *The Strayed Reveller and other Poems*, by 'A.' The publication attracted but little attention, so little, in fact, that the ed. was withdrawn very hastily. This collection, although it contained a number of poems of little merit, at the same time contained much that was very meritorious and that has gained for itself a permanent place in Eng. literature. In 1852 appeared his *Empedocles on Etna and other Poems*, again by 'A.', but this also was quickly withdrawn, to be followed, however, in the next year by a collection of poems, many of which had been already pub., together with an essay which embodied A.'s idea of poetry. A year before the publication of *Empedocles on Etna*, A. had been appointed by Lord Lansdowne to an inspectorship of schools, and he did an immense amount of good to education in England by the work which he performed as an inspector. His official reports were both interesting and instructive, and his reports on the various foreign tours of inspection which he undertook did a great work. His report on Ger. schools he himself considered most important, since he repub. it twice. He had a great admiration for the Ger. system of education. He himself remarked that the Fr. *univ.* lacked liberty, the Eng. science, but the Ger. neither. Many of his advocated reforms were carried out both in schools and univs.

In 1857 A. had been appointed to the chair of poetry at Oxford, and he retained this chair for 10 years, being the first layman to occupy it. Amongst the new poems which were pub. in 1867 we find his greatest poem, *Thyrsis*, a monody on his dead friend, Arthur Clough. He had ceased to be prof. of poetry, but he still occupied a place as a poet second to none, save perhaps Tennyson. By his half-philosophical, half-theological books A. attracted much attention, and he struck the keynote of his philosophy in preaching his favourite doctrine of 'sweetness and light.' His application of literary methods of criticism to the Bible aroused great interest in the country. He argued that much that was wrong in the theology of the time rested solely on the fact that the Bible was read as a scientific work, whereas his own conception of it was that it was literary, and therefore the methods of literary criticism could be applied to it. *Literature and Dogma* (1873) marks the breaking away entirely of A. from Christian doctrines. His methods of criticism were not always fair, nor always in good taste, but his own criticism roused so much bitter feeling that the methods adopted by both



sides contain much that cannot be commended. In 1883 he received a pension of £250 per annum, and in the same year he lectured in the U.S.A. He d. at Liverpool of heart failure, occasioned by his having imprudently vaulted over a fence. He was buried at Laleham.

Amongst his works are included his poem on *Alaric at Rugby*, 1840, and his Newdigate prize poem on Cromwell, 1843; *The Strayed Keveller and other Poems*, 1849; *Empedocles on Etna*, 1852; *Poems*, 1853; *Essays in Criticism*, 1865; *New Poems*, 1867; *Lectures on the Study of Celtic Literature*, 1867; *Culture and Anarchy*, 1869; *Literature and Dogma*, 1873; *Irish Essays*, 1882; *Discourses on America*, 1885. His collected works (including a bibliography) were pub. in 1903-4, and letters in 1895 and 1901. Lives, by A. Birrell, 1892; G. Saintsbury, 1899; F. L. Bickley (*Matthew Arnold and his Poetry*), 1911; Sir A. T. Quiller-Couch, 1918; Sir W. Raleigh, 1923; E. Blunden, 1932; L. Trilling, 1939; E. K. Chambers, 1947. See also C. Dymont, *Matthew Arnold* (selection, with introduction), 1948.

**Arnold, Samuel** (1740-1802), an Eng. musician. He was employed by the musical directors of Covent Garden, for whom he wrote many operas. His first opera was *The Maid of the Mill*, which was produced in 1765. In 1769 he leased Marylebone Gardens, where he produced many operas. In 1773 he was given the degree of Mus.Doc. by Oxford Univ. He became organist of the Chapel Royal 10 years later, and was afterwards appointed to the same position in Westminster Abbey. He is best known as the editor of a collection of cathedral music and of the works of Handel.

**Arnold, Thomas** (1795-1842), headmaster of Rugby, b. at W. Cowes. His early education was received at Westminster, but in 1807 he passed on to Winchester, where he remained until he entered the univ. of Oxford in 1811. He entered at Corpus Christi College, but 4 years later was elected a fellow of Oriel College, where he remained until 1819. His dread of insincerity led him to hesitate deeply before he took orders, but once his doubt of his own realisation of the Christian faith had passed, he became a devout and passionate Christian. After leaving the univ. he settled down at Laleham, near Staines; here he took pupils for preparation for the univ., and also devoted himself to study and to the commencement of his *History of Rome*. Shortly after his arrival at Laleham he married Mary Penrose, the daughter of a Nottinghamshire rector. After 9 years' stay, he was appointed to the headmastership of Rugby School, 1828, and here he proceeded to do what had been prophesied of him, 'that he would change the face of education all through the public schools of England.' Schools were no longer to be mere places where the classics and a certain amount of general knowledge was learnt, but places in which the intellectual and the moral life were harmoniously blended, training places for Christian gentlemen. He found

time to continue his studies amidst his school work, and he did a great amount of literary work. In 1841 he was appointed regius prof. of modern hist. at Oxford, where, during 1841-42, he delivered 8 lectures. In 1842, while preparing to spend the long vacation at his house at Fox How in Westmorland, he was seized with an attack of angina pectoris and d. June 1. He pub. many vols. of sermons, an ed. of Thucydides, a *History of Rome to the Second Punic War* in 3 vols., 1838-1843, and *Introductory Lectures on Modern History*, 1842.

**Arnold, Thomas** (1823-1900), second son of Dr. A. of Rugby. He was educated first privately by Herbert Hill, a cousin of Southey, and afterwards passed through Winchester to Rugby. Abortive attempts at establishing in turn a farm and a school made the offer of a position as inspector of schools eagerly accepted. In 1856 he sought refuge from religious doubts by joining the Rom. Catholic Church. Newman offered him a professorship of Eng. literature at the Catholic Univ. at Dublin. Here he compiled his *Manual of English Literature*, 1862. His broadening views led to a rupture between him and the Catholic Church, which, however, he rejoined. His works include *Passages in a Wandering Life*, 1900, and many valuable eds. of the Eng. classics.

**Arnold, Thomas Kerchever** (1800-53), a prolific writer of educational and theological works. He was educated at Trinity College, Cambridge. He was a determined opponent of the Oxford Movement. He earned a wide reputation for his numerous classical school books. His first scholastic work was *The Essentials of Greek Accidence*, which was an immediate success. His *Practical Introductions* to Gk. and Lat. prose composition appeared in 1838 and 1839. His *Fall of Abel* was a sermon, which was first pub. in vol. iii. of *Family Sermons*.

**Arnold-Forster, Hugh Oakeley** (1855-1909), grandson of Dr. Arnold of Rugby, a politician and authority on army and navy questions. He was educated at Rugby, afterwards passing to Univ. College, Oxford. After gaining recognition as the possessor of a marked talent for hist., he came to London, where he studied for the Bar. Before he achieved any success, however, he became interested in politics, especially those dealing with Irish questions. He pub. *The Truth about the Land League* shortly after his advent into the political arena. His political ideas, in the beginning of Liberal tendencies, changed to a sympathy with the Unionist cause. About 1884 his energies, directed against certain army conditions, led to an adoption of improved organisation. Under the premiership of Mr. Balfour he was offered the position of secretary for war. His determination to advance a special scheme of army organisation for the purposes of efficiency in the event of sudden invasion led to an estrangement between himself and the Cabinet, and its failure, owing to the consequent disruption, resulted. In 1908 he pub. *The Army in 1906*, which

defended his own scheme while it adversely criticised that of his successor, Mr. Haldane. At this time his health gave way, and further active political interest was rendered out of the question. The tariff reform movement had in him one of its early advocates.

**Arnoldus de Villa Nova**, also called **Arnau de Villeneuve** (d. c. 1313), was probably of Sp. origin, and was famous as an alchemist, astrologer, and physician. He lived during the thirteenth and fourteenth centuries, and appears to have studied chem., medicine, and Arabian philosophy. After living at the court at Aragon, he is believed to have lived for some time in Paris. He was forced into exile in Sicily owing to the hostility of the Church towards him. On the illness of Clement V. he was summoned to attend him at Avignon, but d. on the way. Amongst the writings attributed to him on somewhat small authority are *Rosarius Philosophorum*, *Novum Lumen*, *Flos Florum*, and the *Breviarum Practicæ*.

**Arnott, Archibald** (1771-1855), a Scottish physician, was b. at Dumfries. He was military doctor at St. Helena, and there gained the friendship of Napoleon and assisted at his last moments. He pub. a vol. of memoirs of Napoleon.

**Arnott, Neil** (1788-1874), b. at Arbroath. After having graduated M.A. at Aberdeen, he studied medicine, and was appointed surgeon to the E. India Company. He began to practise in London in 1811, and attained eminence as a physician and physicist, being appointed physician extraordinary to the queen in 1837. Author of *Elements of Physics*, 1822-29, and of sev. hygienic inventions.

**Arnotto, or Arnatta**, see **ANNOTTO**.

**Arnould, Sophie** (1740-1802), Fr. operatic singer, b. in Paris; entered grand opera, 1757; the most prominent singer at the Royal Opera, Paris, till 1778. Among her chief parts were those of *Iphigénie* in Gluck's *Iphigénie en Aulide*, *Eurydice* in his *Orphée et Eurydice*, and the prin. rôles in Rameau's works. She was famous for her wit and conversational powers, and was the friend of D'Alembert, Helvétius, Diderot, and Rousseau. See collection of her *bons mots* in *Arnouldiana*, 1813, and her *Life* by the brothers Goncourt, 1857.

**Arnould-Plessy, Jeanne Sylvanie** (1813-1897), a Fr. actress, was b. at Metz. She married Auguste Arnould, a Fr. man of letters. After acting at Paris, she forfeited her rights as a member of the Fr. Theatrical Society by going to act at St. Petersburg, but she afterwards returned to the Théâtre Français in 1855. She created a large number of rôles, but excelled in the part of a coquette.

**Arnprior**, tn. of Renfrew co., Ontario, Canada, on Chats Lake, 38 m. W. of Ottawa. In the neighbourhood are marble quarries and iron mines, and the tn. contains large lumber mills. Pop. 4000.

**Arnsberg** is a tn. on the R. Ruhr, in

Westphalia, Germany, 36 m. E. of Hagen. It was the seat of the anct. Vehmgerichte, and is the cap. of the gov. of A. Pop. 12,000.

**Arnstadt** is a tn. in the former Ger. principality of Schwarzburg-Sondershausen, 10 m. S. of Erfurt, on the Gera. An old Thuringian city, with manufs. of leather, and a trade in corn and timber. Pop. 20,500.

**Arnsvalde** is a tn. in Germany, in the prov. of Brandenburg, 41 m. S.E. of Stettin, situated between 3 lakes. It had manufs. of iron, machinery, matches, and woollens. Pop. 10,200.

**Arnu, Nicolas** (1629-92), a Fr. theologian of the seventeenth century. He was b. at Nérancourt. He was appointed prof. of theology and metaphysics at Padua, where he d.

**Arnulf**: 1. Archbishop of Rheims, A.D. 989. He was an illegitimate son of Lothaire, and succeeded Adalberon through the influence of the Empress Theophano, thereby ousting Gerbert, who had been designated by Adalberon. A. swore allegiance to Hugh Capet, the great rival of Charles Lorraine, uncle of A. and true heir to the throne of France. Later, however, A. supported his uncle's cause, but when Hugh overthrew Charles, A. confessing his treachery, was deposed, and succeeded by the famous Gerbert, afterwards Pope Sylvester II. 2. A count of Flanders, son of Baldwin II. and of Elfrith, daughter of Alfred, king of England. He succeeded to the inheritance of Baldwin, c. 918, and is chiefly remembered for having procured the murder of William Longsword, the Norman. He was succeeded by his grandson of the same name in A.D. 993. 3. A Rom. emperor. He was an illegitimate son of Carleman, and nephew of Charles the Fat, the indolent and cowardly king of the W. Franks, who fl. in the ninth century A.D. A., having been made ruler of Carinthia by Carleman, then marched against Charles, whose cowardice in buying off his foes had disgusted him; and when Charles was deserted by his ministers, A. became king in his place and, repairing to Rome, was made emperor. Displayed signal bravery in a great fight near Louvain against the Northmen. Later, allied himself with the warlike Magyars in the vain hope of breaking up the domains of the Moravians. Died about A.D. 900. 4. Fr. Benedictine monk, or Ernulphus (q.v.).

**Arnus** was the name of a famous Gk. priest killed at Naupactus. Apollo in revenge struck the Dorians with a plague, and was appeased only with funeral games instituted in honour of A.

**Aroa** is the name of a dist. of Venezuela, N.N.E. of the Sierra A., and near the stream of the same name. It contains copper.

**Aroer** is the name of two O.T. places. The first was situated in Palestine (tribe of Gad), near a trib. of the Jabbok. It was opposite Rabba of the Ammonites, and Jephthah fought the latter near A. The other A., also in Palestine, was situated

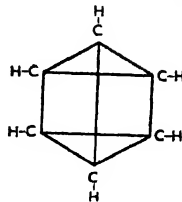
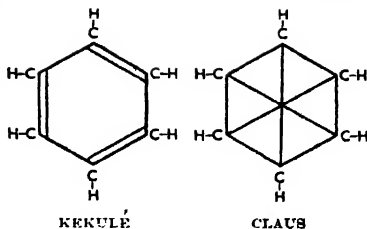
near Arno. It was in anct. times the frontier tn. of Amorreus, and later of the tribe of Reuben. It belonged to the Moabites in the time of Jeremiah. The ruins of it are now called Arayr. For biblical references see Num. xxxii. 34, 1 Sam. xxx. 28, 2 Sam. xxiv. 5, 1 Chron. v. 8, Isa. xvii. 2, Jer. xlviii. 19.

**Arolsen**, the cap. of the principality of Waldeck, is situated on the Aar, 14 m. S.S.W. of Warburg. The castle, which dates from the eighteenth century, contains a valuable library, Pompeian antiquities, and West's 'Death of Wolfe.' Pop. 3000.

**Aromatari, Giuseppe degli** (1586-1660). b. at Assisi and d. at Venice, was a physician and naturalist. He studied logic, philosophy, and medicine at Padua, and practised as a physician at Venice for 50 years, although he had offers from the duke of Mantua, the king of England, and Pope Urban VIII. He had an immense library, which contained many manuscripts. He wrote *Riposte alle Considerazioni di Alessandro Tassoni sopra le Rime del Petrarca*, Padua, 1611; and also works on medicine and natural hist., including an essay on hydrophobia and a letter on the generation of plants from seeds entitled *Disputatio de Rabie Contagiosa, cui preposita est Epistola de Generatione Plantarum ex Seminibus*, Venice, 1625, and Frankfurt, 1626. His proposed work on generation was not completed.

**Aromatics**, substances characterised by a fragrant, spicy taste and odour, as cinnamon, ginger, eucalyptus, camphor, etc.

**Aromatic compounds** form one of the great divs. of organic compounds. They may be looked upon as derivatives of benzene, and are distinguished from fatty or aliphatic compounds by their molecules containing closed chains. The molecular formula of benzene, for instance, is  $C_6H_6$ , but the molecular formula of another organic compound, dipropargyl, is also  $C_6H_6$ . The chemical behaviour of the 2 compounds is, however, markedly different; dipropargyl combines easily with bromine, giving additive compounds, and is very unstable; benzene is remarkably stable, and gives usually substitution products, that is, products where certain atoms are displaced by an equivalent number of other atoms or radicals, without the state of combination of the rest of the molecule being altered. Examination of the behaviour of benzene led Kekulé in 1865 to the conclusion that the molecule of benzene is symmetrical, and that each carbon atom is directly united to one, and only one, atom of hydrogen. As carbon is assumed to be quadrivalent, its combination in a compound must be expressed in a graphic formula by drawing 4 lines from each carbon atom to the other atoms to which it is directly united. This has been done in sev. ways, each of which agrees with many of the phenomena in the chemical behaviour of benzene. The earlier formulae were:



LADENBURG

A later formul., suggested by Armstrong and Baeyer, appeared to be more satisfactory. In this formula, one valency of each carbon atom appears directed towards the centre, in order to express that by the mutual action of all the 6 valencies the power of each is rendered latent, and this agrees with the facts relating to benzene and its derivatives.

Modern work on valency (q.v.) has thrown new light on the whole problem. Thiele's suggestion that the residual valency of each carbon atom is uniformly distributed round the ring is now accepted, in essentials.

A. Cs. usually contain a larger percentage of carbon than aliphatic compounds, and have a characteristic reaction with nitric acid, producing nitro-compounds; and also with sulphuric acid, producing sulphonic derivatives. When nitro-compounds are reduced, they are converted into amino-compounds, which are converted into diazo-compounds on treatment with nitrous acid in the cold; if the solution is warmed, phenols are obtained. A. alcohols are prepared by methods analogous to those employed in producing aliphatic alcohols: the corresponding halogen derivatives are heated with water, weak alkalis, or silver hydroxide.

**Arona**, a tn. on the W. shore of Lake Maggiore, Piedmont, Italy. It is beautifully situated, and the neighbouring country produces wine. It is engaged in a transit trade between Piedmont and

Switzerland. At the castle adjoining A. St. Carlo Borromeo, archbishop of Milan, was b. Pop. 6300.

**Aroodje of Orooch**, see **BARBAROSSA, HORUK**.

**Aroostook** is the name of a riv. which rises to the N. of Maine, and flows into the St. John in New Brunswick. In length 120 m., it is known in hist. on account of its connection with the much-discussed and troublesome question of the N.E. boundary between Brit. America and the U.S.A.

**Arosa**, a Swiss holiday resort, 19 m. E. of Coir, situated amidst pine woods, at an altitude of nearly 6000 ft.

**Arouet**, François Marie, see **VOLTAIRE**.

**Arpad** (c. 870-907), the hero of Hungarian ballad and romance, and founder of the kingdom of Hungary. He founded the A. dynasty, which lasted till 1301.

**Arpeggio** is a chord in music of which the notes are played in very rapid succession, instead of simultaneously.

**Arpent** is the name of an old Fr. measure for land, which approximately corresponded to the Eng. acre. It was equal to 100 sq. perches, and according to the value of the perch in different localities the A. varied from one and a quarter to five-sixths ac., or in modern Fr. measures, from one-third to one-half hectare.

**Arpino**, the anct. *Arpinum*, is a tn. of S. Italy, in the prov. of Caserta. It is perched on an eminence midway between Rome and Naples, and was the bp. of Caius Marius and Cicero. It was owned successively by the Volsci, the Samnites, and the Romans. It now manufs. woollens, linen, paper, etc. The walls of the old pre-Rom. gate were blasted by the Gers. In the Second World War to make gun emplacements. The Gers. stole the valuable coin collection. Pop. 10,600.

**Arqua Petrarca** is the name of an It. vil. in the Euganean Hills, 12 m. S.W. of Padua. Here on July 18, 1374, Petrarch d. Pop. 1800.

**Arquata del Tronto**, vil. of Ascoli, Italy, on R. Tronto, 17 m. S.W. of Ascoli. Pop. of com., 5300.

**Arquebus**, or **Harquebus**, a hand-gun, forerunner of the modern rifle, dating from the fifteenth century. Those of the earliest construction were fired by a 'match' from the touch-hole. The ball fired by them weighed 2 oz. They were first fired from a forked rest at the height of the chest, but the Gers. invented a hooked form of butt, and elevated the barrel.

**Arques** is a tn. in the Fr. dept. of Pas-de-Calais, 2 m. S.E. of St. Omer. It possesses the finest ruins of an anct. feudal castle in the dept. The R. A., flowing through the dept. of Seine-Inferieure, is navigable from A. to the Eng. Channel. Pop. 4700.

**Arracacia**, a genus of S. Amer. plants of the order Umbelliferae. The tuberous roots of *A. xanthorrhiza* (arracacho) and *A. esculenta* are edible.

**Arracan**, see **ARAKAN**.

**Arrack** is a spirituous liquor manuf. in the E. Indies from a large variety of

substances, fermented rice, or coconut juice, etc. Pure, clear, and transparent, and of the colour of straw, when properly made it has a peculiar but agreeable taste. It contains 52-54 per cent of alcohol.

**Arragon**, see **ARAGON**.

**Arrah** is a tn. in the Shahabad dist. of Bengal, 320 m. N.W. of Calcutta. In 1857, a dozen Englishmen, with 50 Sikhs, defended an ordinary house against 2000 sepoys and 8000 armed insurgents, till finally relieved by Maj. Eyre.

**Arraignment** is an Eng. legal term signifying the calling of the prisoner to the bar of the court to plead 'guilty' or 'not guilty' to the indictment against him. It corresponds to the Scottish legal term 'calling the diet.'

**Arran** is the largest is. in the frith of Clyde, Scotland, lying between the Mull of Kintyre and Ayrshire. It is about 20 m. long, and 11 m. broad at its widest part. Its area is 105,814 ac. In winter a daily steamer maintains communication with Brodick and Lamlash, whilst in the summer the number of steamers which call is much greater. The general aspect of A. is mountainous, the N. peaks being very imposing. An anct. sea-margin encircles the coast with a low platform; the country rises abruptly to the high peaks on the S. and S.W. The geology of A. is of peculiar interest, for within its comparatively confined limits distinct sections of the great geological formations can be observed; the botany, also, of the dist. repays study by the variety and rarity of many of its plants. Relics of anct. times exist in the shape of Dan. forts, cairns, standing stones, etc. A few red deer may still be found in the wilder hilly dist., and blackcock and grouse abound; the game of the is. is, however, strictly preserved. Lamlash, which possesses a very fine natural harbour, and Brodick are the chief vils. The is. is a favourite resort of summer visitors. Pop. 2500.

**Arran, James Hamilton, Earl of** (c. 1515-1575), regent of Scotland during the minority of Mary Stuart. He was created duke of Châtelherault by Henry II. of France. In 1554 he resigned his position as regent to the queen-mother, Mary of Guise, and went to France. He, however, returned to Scotland to take part in the intrigues against Elizabeth. In 1573 he acknowledged James VI.'s authority and laid down his arms.

**Arran, James Stuart, Earl of** (d. 1596). He overthrew Morton, who had been regent of Scotland since 1569, and with the duke of Lennox managed the affairs of Scotland until 1585, when he was deprived of his authority.

**Arrangement of music** is the adaptation of a piece of music to an instrument or instruments other than those for which it was originally composed; as when orchestral compositions are arranged for the pianoforte. The pianoforte A. of Franz Liszt, though occasionally passing the limits of the fitting, are acknowledged to be unexcelled. Many of the master-musicians have arranged their own music.

**Arras**, the cap. of the Fr. dept. of Pas-de-Calais, is situated on the R. Scarpe, 120 m. N. of Paris. It is composed of 2 parts, the old tn., standing on an eminence, and the new tn., in the plain. Amongst the prin. buildings are the cathedral, of the eighteenth century, and the Gothic town hall, dating from the early sixteenth century. The Eng. word *arras* is derived from this tn., so famous was it for its tapestry. It manufs. lace, hosiery, sugar, and agric. implements, and has a considerable commerce in corn and oil; pop. 31,500.

**Arras, Battle of.** The first of the big battles of the third year of the First World War. The previous year (1916) had closed on the doubtful note of the battle of the Ancre (*q.v.*), which if it accomplished anything for the Allies, had at least the merit of definitely pressing the Gers. back to the Hindenberg line. This famous line they reached by Apr. of 1917. As a position it left almost nothing to be desired in point of natural and artificial defences, besides giving to the enemy the advantage of a much shorter front than on the Somme and Ancre. Its flaw was the uncertainty of its axes—the positions round Arras to the N. and those of Laon to the S. In the hope of pushing home such advantages as had been gained in 1916, the Allies were now preparing a general offensive on both these axes. The Fr. were to attack on the Laon front and the Brit. on that of A. The Brit. general advance began on Easter Monday, Apr. 9, after the usual preliminary bombardment, on a front of about 48 m., the objectives being, in the N., Lens and its surrounding cluster of coal villages, and in the S., Quéant, the nearer end of the hard-contested and powerfully fortified Drocourt 'switch' line. Had the Brit. offensive succeeded in taking these 2 points, the road to Cambrai would have been open. All went well in the opening stages, and by Apr. 11 the famous Vimy Ridge, together with 3000 yds. of the formidable Hindenburg line was taken, in addition to over 10,000 prisoners and 160 guns. All arms co-operated smoothly, the work of the tanks being a great advance on their performances of 1916. But though Lens was hemmed in, Quéant, at the other end, was not shaken. It now remained for the Fr. to deliver their blow, and the result was the disastrous battle of the Aisne heights begun on Apr. 16. (*See under AISNE, BATTLE OF TIE*). The idea of the 'decisive blow,' which was to be struck simultaneously at A. and Laon had failed. In Mar. 1918 the Gers. made a desperate attempt to capture A., but the Brit. line held firm and so saved not only that city but also Amiens (*q.v.*). In the Second World War Brit. troops entered A. on Sept. 1, 1944.

**Arrastre**, a Mexican and Amer. mule-mill for grinding ore.

**Array, Commissions of**, *see under COMMISSION, MILITARY*.

**Arreboe, Anders Kristensen** (1587–1637), a Dan. poet. After having studied at Copenhagen Univ., he took holy

orders, and became bishop of Trondhjem in 1618. His conduct of life being, however, such as to disgrace his office, he was deposed therefrom, and lived in retirement till his death. His chief work was the *Hexameron*, or *Six Days of the Creation*.

**Arredondo, Isidoro** (1653–1702), a Sp. painter. He was the pupil first of José García, and then of Francisco Ricci. He was employed by Charles II. to paint his portrait, and the frescoes of the palace of Buen Retiro are his work, but his most famous picture is one of *Psyche*.

**Arreoy**, an old institution of the Society Is. It was believed to involve infanticide for political purposes, but we have very little authentic information about it. Cook brought the first account of it to Europe in 1771, and other accounts have been given by Dr. Forster and by W. Ellis in his *Polynesian Researches*, 1832–36.

**Arrest** is the restraint of a man's person, in order that he may be compelled to obey the law, or be brought to trial. It is defined to be the execution of the command of some officer of justice or some court of record. As, in England, can take place in either civil or criminal cases. In civil cases, however, it is only in somewhat exceptional instances that A. takes place. The chief, and practically the sole, cause of such A. is 'contempt of court'; all the superior courts have power to arrest persons for this reason. This is done by the issue of a writ, by an order of the court or of a judge to the sheriff. Imprisonment for debt was ended by the Debtors Act of 1869, and consequently the writ 'capias ad satisfaciendum' is now rarely issued. It is only made use of in such cases as are excepted from the above Act; such are, when non-payment involves contempt of a competent court, or when a trustee refuses to comply with the order of a court of equity. A debtor may also be arrested to prevent him from absconding or removing his property out of the jurisdiction. A. 'in *meno process*,' that is, during the progress of a suit, is now abolished, with the above exceptions. The following are exempt from A. on civil process: Ambassadors, or diplomatic representatives of foreign courts, peers of the realm, members of Parliament, clergymen during divine service, or on their way to or from service, and all persons attending a court of justice in any capacity, such as witnesses, solicitors, counsel. No person is, however, exempt from A. for contempt of court.

All persons whatsoever are liable to A. in criminal cases; any man may A. without warrant or precept, and outer doors may be broken open for such a purpose. The A. may be either with or without a warrant. A warrant is an order addressed to a peace-officer by a judge or magistrate. If the person named thereon is not in the jurisdiction of the issuing authority, the warrant must be 'backed' by a magistrate of the place where he actually is. A private person is entitled to arrest any one who commits

a felony, or inflicts a dangerous wound on any one, in his presence, any one whom he has good cause to suspect of felony, or any one whom he discovers committing certain offences specially provided for by statute. The remedy for wrongful A. is an action for false imprisonment.

**Arrest of Judgment**, see JUDGMENT.

**Arrestment**, a Scottish legal term is the process by which a creditor detains the goods or effects of the debtor in the hands of a third party till he is paid. It is divided into 2 kinds: (1) A. in security is used when a claim has not yet become enforceable, as at the commencement of the legal proceedings; (2) A. in execution is used following on a decree of the court, or on a registered document. A. merely retains the effects; the process of 'furthercoming' is necessary to realise on them. Such funds as are necessary for the sustaining of life are not liable to arrestment.

**Arretium or Arretium**, one of the most important of the 12 cities of Etruria, especially famous for its pottery, which was a red ware. See AREZZO.

**Arrhenius, Johan** (1811-99), a celebrated Swedish botanist and agriculturist, b. at Klöfala, in Sweden. He was a member of the scientific societies of Upsala and Stockholm; sev. plants have been named after him.

**Arrhenius, Svante** (1859-1927), a Swedish scientist, b. at Upsala; studied and began to teach at Upsala Univ.; became a prof. of physics at Stockholm in 1891. He was awarded the Davy medal in 1902, and became a member of the Chemical Society in 1898. His theory of electrolytic dissociation is a valuable contribution to science; his *Text-book of Electrochemistry* has been translated from the Ger. by McCrue. He pub. *Destinies of the Stars* (Eng. translation by Fries) in 1918, and the year before he d. he issued a revision of 2 of his earlier astronomical works.

**Arrhidæus, or Aridæus** (d. c. 317 B.C.), a son of Philip III. of Macedonia and a courtesan, was half-brother to Alexander the Great, and on his death in 323 B.C. was named his successor. He married Eurydice, grand-daughter of Philip's elder brother, Perdicas, and, being of weak intellect, became the tool of his father-in-law, his wife, then of Antipater and Polysperchon. He and Eurydice were put to death by Olympias, mother of Alexander.

**Arrhythmia**, a medical term applied to irregularity of the action of the heart, manifesting itself in a lack of rhythm in the beat of the pulses, etc.

**Arria**, the wife of Cæcina Pætus, who, when her husband was implicated in the plot of Scribonianus against the Emperor Claudius and condemned to death, resolved not to survive him, and stabbing herself with a dagger, then handed it to her husband with the words, 'Pætus, it does not hurt.' Her daughter Arria would have imitated her example in similar circumstances, but was dissuaded by her husband for the sake of their children. She was sent into banishment.

**Arrlaga, Manoel José de** (1839-1917), Portuguese president and lawyer, b. at Horta, Azores, of a distinguished family which was descended from Don Alfonso III. of Castile. He became the first president of the Portuguese republic, in succession to the provisional president, Dr. Braga. Studied law at Coimbra Univ., and while there was disinherited by his father for his republican sympathies. Elected deputy for Funchal as a republican in the parliament of 1882-84 and for Lisbon, 1890-92. Elected president 1911, defeating Bernardino Machado. Wrote essays on jurisprudence and political economy.

**Arrianus, Flavius** (c. A.D. 100-170), a native of Nicomedia, in Bithynia. He was admitted to the citizenship of Athens, but came over at an early age to Rome; he was a disciple and friend of the Stoic philosopher Epictetus. He was appointed prefect of Cappadocia in 136, and distinguished himself by a campaign against the Alani. He was later, under Antoninus Pius, raised to the rank of consul; this was the first instance before the third century when a first-rate Rom. command was given to a Gk. He spent a considerable portion of his time at Athens, where in 147-48 he was appointed archon. But within 4 years of his being raised to consular rank he apparently retired from public life, and devoted himself to the study of literature in his native place. By his conservation of notes on Epictetus's lectures he ranks as the chief authority for Stoic ethics, whilst his most important original work, the *Anabasis of Alexander*, is our chief authority on its subject. Complete works were ed. by F. Dubner (1846), Eng. translation by Rooke (1812), E. J. Chinnock (1893).

**Arrière Ban**, a feudal summons to all freemen to follow their sovereign to the field with vassals, provender, etc.

**Arrighi, Toussaint, duke of Padua** (1778-1853), a Corsican general, was b. at Corte, in Corsica, and d. at Paris. He distinguished himself in the Egyptian campaign, and in 1809 was made general and duke of Padua. He also took a leading part in the battle of Leipzig, 1813, and in the campaign of France, 1814. In 1849 he was appointed deputy for Corsica at the legislative assembly, and in 1852 was made senator.

**Arria** is an architectural term, which signifies the line in which the 2 straight or curved surfaces of a body, forming an exterior angle, meet each other.

**Arroba** is a measure of weight used in the greater part of Central and S. America. In the Sp. states it is generally about 25 to 35 lb.; in Brazil it equals 32 to 33 lb. It is also used as a measure for liquids.

**Arrö**, a Dan. is. off the E. coast of Sleswig, S. of the is. of Fünen. The surface is flat, but the soil is productive. Arröskjöbing in the E. is the chief tn. Pop. of is., 11,000.

**Arrol, Sir William** (1839-1913), head of the firm of Wm. Arrol & Co., engineers, who constructed the Tay and Forth Bridges and the Manchester Ship Canal

under his direction. Represented S. Ayrshiro in Parliament, 1895-1906.

**Arromanches, Harbour of,** an artificial prefabricated harbour used in the early days of the Anglo-Amer. invasion of Normandy in 1944. Without this harbour it would have been necessary to storm Cherbourg or Le Havre, but great difficulties would have been experienced in attempting to reoccupy those ports, for the Gers., even had they been expelled, would have wrecked the port installations, and the subsequent development of the battle of Normandy would have been very different (*see* WESTERN

new design for the spans and the pontoons of standard Royal Engineers' floating bridging equipment. The prototype was constructed on a Scottish beach early in 1943, and tests showed that 6 spans mounted on floats or about 500 ft. of the floating bridge could be towed in the open sea in any weather up to a given wind force, and that the unit would be complete in itself and ready for joining up. There were, however, many problems apart from that of flexibility. Owing to the 22-ft. tidal range at A. It was clear that the pierheads must be floating in order to avoid the difficulty of a connection with



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#### PIER AND PIERHEAD AT ARROMANCHES

The first traffic moving off a completed pier, June 18, 1944.

FRONT IN SECOND WORLD WAR). The specialised civil engineering knowledge and experience essential to such an undertaking were first acquired in 1941-42 in constructing military ports in Scotland to supplement Brit. civil ports and in planning port extensions in the Middle E. to offset the closing of the Mediterranean. This involved the use of vessels specially designed to carry complete repair workshops and heavy lifting and construction gear; self-contained cranes; and sectional dock-gates to replace the permanent structures wrecked by the enemy. At this time, too, special landing craft were developed, and amphibious trucks for unloading stores. But in 1942 the Directorate of Ports and Inland Water Transport, which supervised these developments, was asked to produce piers a m. long to extend from shore to water deep enough for coasters to lie alongside, strong enough to take the heaviest weapons, and capable of being put together in a few days and of riding out summer storms. This meant an entirely

the floating pier on the one side and a widely varying freeboard on the other, which would have necessitated lifting the vehicles off the ships instead of running them over short ramps. Instead of mooring anchors and cables for these floating pierheads, which would have fouled their berths, the principle of spud legs or vertical posts, nearly 100 ft. long and 4 ft. square, as used on dredgers, were developed on a large scale. To raise or lower these spud legs, each pontoon was equipped with an electric power plant and electrically operated winches. Several pierhead pontoons could be assembled together in various ways according to the purpose in view—in line to form a wharf, in extension of the pier to form a jetty, or by combining both forms. Mooring the floating bridge was effected by the 'kite' anchor with a great holding power, and so designed as to allow each pontoon to be moored fore and aft in 6 min. The arrangement of the connection of the bridge girders with the pontoon saddles gave sufficient

play for lateral and vertical movement between the spans of the pontoon. The twisting which occurs as the different pontoons heave in relation to each other was taken entirely by allowing the floor of the bridge span itself to twist and this could be as much as 40 degrees before fracturing. Many types of breakwater were considered in the effort to find one that would not break itself or its moorings, but, for really rough weather, the only immediate alternative was lines of blockships. These, however, were only effective in up to 1 fathom of water and the pierheads had to have 3 fathoms. Hence it was necessary to have some kind of caisson for the bulk of the breakwaters. Six miles of breakwater were required, and dry-dock facilities round the Brit. coast were much strained by the labour of constructing the caissons, which were all about 200 ft. long and in 6 heights varying from 60 ft. down to 25 ft., with dead weights from 7000 tons to 1700 tons each; but the large size constituted the greater part of the breakwater. To increase structural strength the units had cross walls and a central longitudinal water-tight bulkhead, thus forming cells on each side of the bulkhead. Flooding valves of varying sizes were allocated to the watertight compartments, and when all the valves were open the sinking times at A. varied from 5 min. to 20 min. according to the depth of the water and other factors.

Dispatch of the equipment at a towing speed of 4½ knots across the Channel began on the evening of D Day (June 6, 1944), and by June 10 the harbour construction at A. was proceeding well. All the 15 blockships had been planted and some 10 caissons were either sunk or being sunk, and 1500 ft. length of the centre floating pier was in position. But 12 days after D Day a storm of unprecedented force for June sprang up and held for sev. days. On the side W. of A., where the Amers. were establishing their harbour, great damage was done. Many craft broke their moorings and crashed into the partially erected equipment and into some of the caissons. The sea-bed here was of softer sand than had been expected and the surging sea soon scoured it from beneath the caissons and blockships, causing them to break their backs. The piers and pierheads, too, suffered badly. But at A. the damage was not nearly so vital, as the breakwater had been nearly completed before the gale was at its height and so afforded shelter to both craft and pier equipment, while the seabottom here was much firmer. After the storm A. was soon brought up to full efficiency as a port, but on the Amer. side it was decided not to re-establish the floating pier equipment, though the long breakwaters were completed and the harbour used mainly for protected beach discharge from 'ducks' and other special landing craft. A. functioned as a harbour in every sense of the word, and its name will be remembered in the hist. both of

civil engineering and of the world's ports. See Sir Bruce G. White, 'The Harbour of Arromanches' in *The Overseas Engineer*, Oct. 1945.

**Arrondissement** is the name of the largest subdivision of the Fr. dept. It is composed of cantons, which are divided into communes. Each A. has a sub-prefect and council to manage its affairs. France is also subdivided for purposes of defence into 5 maritime divs. termed As. They were instituted under the consulate, suppressed in 1815, but re-estab. again in 1826. They are under the direction of maritime prefects who, by a decree of 1875, must be vice-admirals in the Navy.

**Arroo or Arru**, see ARU.

**Arrow**, see ARCHERY.

**Arrowgrass**, or *Triglochin palustre* and *T. maritimum*, is a plant of the order Juncaceæ, occurring in Britain. The former species is common in marshes and pools, while the latter grows in salt-water marshes.

**Arrowhead**, or *Sagittaria sagittifolia*, is a species of the order Alismaceæ and genus *Sagittaria*; it is a native of Europe. It is a water-plant, only the arrow-shaped leaves and the flowers appearing above the surface. There are also leaves below the water, and these are very thin and ribbon-like; the root is a rhizome.

**Arrow-leaf**, a plant of the *Sagittaria* genus.

**Arrowrock Dam**, a dam 354 ft. high, on the Boise R., Idaho, U.S.A. It was constructed by the Bureau of Reclamation, a body estab. by Act of Congress, 1902.

**Arrowroot**, a farinaceous substance prepared from the roots or tubers of various plants: *Maranta arundinacea* and *M. indica* and *Curcuma angustifolia* the E. Indian A.; *Arum maculatum* the Portland A. Grown down, strained carefully, and dried in the sun, the preparation forms a valuable and easily digested food; it is often adulterated with potato starch. The S. Amer. Indians used to apply the roots of a plant confounded with *Maranta* as an antidote to the effect of poisoned arrows—hence the name.

**Arrowsmith**, Aaron (1750-1823) a distinguished Eng. cartographer, was b. at Winston, in the co. of Durham. He came up to London, and by 1790 had founded a great map-making business, raising the execution of maps to a pitch of excellence never before attained.

**Arrowsmith**, Edmund (1585-1628), was b. in Lancashire, and entered the Society of Jesus in 1624. He pursued his missionary labours in his native county with zeal and success. Twice apprehended for his faith, he was found guilty in 1628, and hanged, drawn, and quartered, in accordance with the custom of that age.

**Arrowsmith**, John (1790-1873), nephew of the elder Aaron A., to whose business he succeeded. His first publication, in 1834, was the well-known *London Atlas*. Helped to found the Royal Geographical Society in 1830. He received a gold medal in 1863 for his services to geographical science.

**Arroya del Puero** is the name of a tn. situated in Estremadura, Spain, about



10 m. to the W. of Cáceres. Pop. about 6000.

**Arroyo, Diego** (1498-1551), a Sp. painter who was b. at Toledo and d. at Madrid. His works consisted of miniatures and portraits, and he also illustrated some works in the library of the cathedral of Madrid.

**Arroyo Molinos** is a vil. in Estremadura, Spain, 27 m. S.E. of Cáceres. Here Lord Hill completely routed the Fr. forces under Gen. Girard on Oct. 28, 1811. He took 1500 prisoners with trifling loss; Thiers and other Fr. historians describe the battle as indecisive.

**Arru Islands**, see ARU.

**Ars Poetica**, or the *Epistle to the Pisos*, is one of the finest of the poems of Horace. The date of it is uncertain, though it appeared before the poet's death in 8 B.C. The title of the *Art of Poetry* for the *Epistle to the Pisos* is as old as Quintilian, but it is now agreed that it was not intended for a complete theory of the poetic art. It is conjectured with great probability that it was intended to dissuade one of the younger Pisos from devoting himself to poetry, for which he had little genius, or at least to suggest the difficulties of attaining to perfection.

The poem is a discussion of dramatic poetry, largely based on Gk. text-books, but full of Horace's own experience and of his own good sense. Young aspirants to poetical fame regularly began with tragedies, and Horace, accepting this as an actual fact, discusses the rules of tragedy with as much gravity as if he were dealing with some really living and national form of poetry. This discursive and fragmentary poem was taken in later ages as an authoritative treatise; and the views expressed by Horace on a form of poetical art with which he had little acquaintance had, at the revival of literature, and even down to the last century, an immense influence over the structure and development of the drama. Just as modern comedy based itself on imitation of Plautus and Terence, and as the earliest attempts at tragedy followed in the steps of Seneca, so in the theory of both Horace, and not the Gks., was the leading influence.

**Ars-sur-Moselle**, a tn. in Lorraine, situated on the Moselle, a little to the S.W. of Metz. Pop. 3600.

**Arsaces**, Persian name occurring on Persian seals. A. I. was the founder of the Parthian dynasty, and of the dynasty of the Arsacides which fl. in the third century B.C. About 255 he raised the standard of revolt against the rule of Seleucids, and, having succeeded in emancipating his countrymen, was elected king. Reigned for 2 years. All Parthian kings officially bore the name A.

**Arsacides**, dynasty of Parthian kings from its founder Arsaces, who wrested a kingdom for himself from Seleucid Antiochus II. about 250 B.C. The greatest kings were Mithridates and Tiridates. The Arsacidean empire was overthrown in A.D. 226 by Ardeshir, founder of the Sassanid empire.

**Arsamas**, or **Arazmas**, is the chief tn.

of a circle in the Russian Region of Corky, situated at the confluence of the Arsha and the Tesha. The tn. has 22 churches, a monastery, and a convent. The tn. has a somewhat dirty appearance, but the inhab. are prosperous and industrious. Manufs. include Russian leather, iron and silver wares, cloth, etc. Pop. 18,540.

**Arsenal**, the name appears in Romanic languages under various forms, and is of Arabic origin; It. *arsenale*, Sp. *arsenal*, Arabic *dar aḥḥinā'ah*, meaning a house of trade or manuf. The word has been adopted to imply (1) a repository or magazine of arms and military stores of all kinds, both for land and sea service; (2) a public establishment where arms and equipment are manufactured; and hence (3) a repository of any kind of warlike equipment. An A. of the premier or first class includes gun and carriage factories, laboratory, ammunition, and small-arms factory, powder factory, and spacious storehouses. In an A. of the second class the factories are replaced by workshops. As an A. is a source of supply during war, great care is taken to erect it in a suitable position. As. of the first class should be situated at the base of operations, secure from attack, at a safe distance from the frontier.

The prin. As. in Great Britain are Deptford, Chatham, Sheerness, Portsmouth, and Plymouth. Gov. foundries are at Woolwich and small-arms factories at Enfield. Malta and Gibraltar are the chief overseas As.

The sub-divs. of branches in a large A. are: (1) storekeeping; (2) construction; (3) administration. Under (1) are the depts. for armoury, ordnance, and magazines. Under (2) come ammunition, laboratories, and firearms of all descriptions, and under (3) clerical work and its officials.

The chief continental naval As. are: *France*, Cherbourg, Brest, Toulon, Bordeaux; *Germany* (before 1939), Kiel, and the inland factory at Essen; *Russia*, Cronstadt, Leningrad, Sebastopol; *Italy* (before 1939), Naples, Spezia, Genoa, Venice; *Spain*, Cartagena, Cadiz, Barcelona; *Portugal*, Lisbon. For Amer. As. see UNITED STATES—Arsenals.

**Arsenic**, a chemical element (symbol As, atomic number 33, atomic weight 74.91), which is generally looked upon as a semi-metal, connecting, with antimony and bismuth, the great div. of non-metals with that of metals. The term is often applied to the white oxide of A. ( $As_2O_3$ ) which is the most important compound commercially.

The element occurs in very small quantity in nature; it is more usually found as the trioxide in arsenolite, as the sulphide in orpiment and realgar, or as a compound with iron, cobalt, etc., as in arsenical iron and mispickel or arsenical pyrites,  $FeSAs$ . The metallic A. of commerce is chiefly prepared by strongly heating mispickel in earthenware retorts from which the air is excluded, when most of the A. sublimes, together with a little sulphur. The crude metal is sometimes

used as a poison for flies, and as a constituent of lead shot, a small quantity of A. hardening the lead and facilitating the formation of the spherical globules. The pure metal may be obtained from the white oxide by heating it with carbon in the absence of air, which may be effected by covering the oxide in a narrow test-tube with dry powdered charcoal, and nearly covering the mouth of the tube with the finger when heating. The A. sublimes on the cool part of the tube as a dark grey powder.

A. has a sp. gr. of about 5.5 and a specific heat of .083. It crystallises in rhombohedra, and rapidly vaporises at temps. above  $100^{\circ}\text{C}$ . The sp. gr. of the vapour is 150 ( $H=1$ ), so that the gaseous molecule of the element must be looked upon as including 4 atoms.

The chief compounds of A. are the hydride  $\text{AsH}_3$ , the arsenious oxide  $\text{As}_2\text{O}_3$ , A. oxide  $\text{As}_2\text{O}_5$ , the disulphide  $\text{As}_2\text{S}_3$ , the trisulphide  $\text{As}_2\text{S}_5$ , the trichloride, tribromide, tri-iodide, trifluoride ( $\text{AsCl}_3$ ,  $\text{AsBr}_3$ , etc.). Arsenious oxide is formed when arsenical ores are roasted in air; it is sublimated as a white powder. A. oxide is produced when the lower oxide is heated with nitric acid. The 2 oxides are the anhydrides of the 2 acids, arsenious acid and A. acid, which may be distinguished by the colours of their silver salts; the addition of ammoniacal silver nitrate producing a canary-yellow precipitate of the arsenious salt or arsenite, and a brick-red precipitate of the A. salt or arsenate.

As the A. compounds are extremely poisonous, it is of great importance that efficient tests of their presence should be known. Organic matter should first be expelled by digesting with hydrochloric acid and potassium chlorate, chlorine being driven off by boiling. The A. is then precipitated as a sulphite, which is dried, mixed with potassium cyanide, and heated. The A. is then deposited as a black sublimate, which is converted into arsenious oxide if heated in air. The oxide may be recognised by the production of a yellow precipitate with ammoniacal silver nitrate solution, or by a precipitate of Scheele's green with ammoniacal copper sulphate. Reinsch's test consists of boiling a strip of copper foil in the given solution with the addition of hydrochloric acid. If A. is present, it is deposited on the copper and may be recognised as in the previous test. Marsh's test depends on the production of the hydride  $\text{AsH}_3$ . An apparatus for the preparation of hydrogen is fitted with a narrow jet, at which the hydrogen is lighted. If a piece of porcelain be held in the flame, no stain is produced if the materials used for the production of hydrogen are free from A. The solution to be tested is poured into the hydrogen-generating apparatus; if A. is present, the flame assumes a lavender tint and a black stain is produced on the porcelain.

In medicine, arsenious oxide is used as an alterative and tonic in doses of from 1-60th to 1-15th gr. The most frequently used preparation is that known as

Fowler's solution, which comprises arsenious oxide and potassium carbonate, together with a small quantity of compound tincture of lavender. This is administered in doses of 2 minims, largely diluted, and gradually increased to 8 minims. In small doses it acts as a stomachic and is valuable in gastric neuralgia and in the vomiting of chronic alcoholism. In larger doses it acts as a nerve tonic, entering the blood by absorption. Used externally, it is a powerful caustic, and its use has been advocated in cancer, lupus, and epithelioma. Large doses of A. preparations produce a burning sensation in the throat, stomach, and abdomen, followed by vomiting, diarrhoea, cramps, exhaustion, and collapse. Symptoms of arsenical poisoning are frequently observed in those working with arsenical pigments, or in those living in rooms where arsenical pigments have been used in the preparation of the wall-paper. In recent years, widespread poisoning was caused by the presence of A. in a supply of invert sugar used in the brewing of beer. By commencing with small doses and gradually increasing the quantity, a certain degree of tolerance is acquired, as in the case of the A. eaters of Styria, who have been known to swallow more than 6 times the minimum fatal dose with no untoward results.

The stomach pump or emetics are to be used in the treatment of arsenical poisoning. Large doses of castor oil are essential to clear out the intestinal tract to prevent reabsorption. A good antidote is provided by freshly prepared peroxide of iron, produced by adding soda or ammonia to the tincture of iron.

**Artenical Pyrites**, *see* MISERABLE.

**Arsenius** (354-450), probably of Rom. extraction. Gained fame for his knowledge of Gk. and Rom. literature. Theodosius the Great appointed him as tutor to the princes Arcadius and Honorius. Afterwards lived a secluded life in an Egyptian monastery at Scetis, and *d.* at Memphis. Wrote a work containing instruction for monks. Commemorated by Rom. Catholics on July 19 and by Orthodox E. Church on May 8.

**Arsenius, Autorianus** (thirteenth century), patriarch of Constantinople. Educated at a monastery in Nicaea, of which he became abbot. Retired into solitary asceticism in a Bithynian monastery. Called to the patriarch of Nicaea A.D. 1253 by Theodore Lascaris II. Excommunicated Emperor Michael, who banished him to Proconessus, where he *d.* 1264. The new patriarch Josephus absolved the emperor, and this led to the quarrel between the Josephists and Arsenites known as the Arsenian schism, which lasted until 1315.

**Arsiè**, vil. of Belluno, Italy. 3 m. S.W. of Fonzaso. Pop. of vil. 1727: of commune, 7127.

**Arsinoë**, an anct. city of Egypt, the name of which was derived from A., the wife of Ptolemæus Philadelphus, but seems to have been changed to Cleopatra. The site of the modern Suez almost corresponds to that of A. (Strabo, xvi. 769).

A. was also the name of one of the anct. provincial divs. of Egypt which corresponds to the modern Fayum.

**Arsinoë**, daughter of Lysimachus, king of Thrace, and first wife of Ptolemy II. Philadelphus (285-247 B.C.). Banished to Coptos for conspiring against her husband. Her son afterwards became king under the title of Euergetes.

**Arsinoë** (b. c. 316 B.C.), daughter of Ptolemy I. Soter and Berenice; married Lysimachus, king of Thrace. Murdered her stepson Agathocles in order to secure the succession. After her husband's death she fled to Ephesus and thence to Cassandria. Afterwards married her brother Ptolemy II. Her devoted husband gave her name to several cities.

**Arsinoë** (d. 41 B.C.), youngest daughter of Ptolemy XIII. and sister of the famous Cleopatra. During Caesar's attack on Alexandria the inhab. recognised her as their queen. Caesar took her to Rome with him. After Caesar's victory she was allowed to return to Alexandria. She was put to death at Miletus after the battle of Philippi by order of Mark Antony, and at her sister's request.

**Arsinothorium**, an enormous fossil mammal of the Ungulate type, discovered by Beadnell in the Upper Eocene of the Fayum deposits of Egypt. It resembled a rhinoceros in appearance and was herbivorous. Its brain was small, the head massive, and it bore 2 pairs of horns.

**Arsis and Thesis** (Gk. *ἄρσις*, from *αἶψα*, I raise). A. is that part of a poetical foot on which the stress of the voice falls, the rest of the foot being called the T. According to original Gk. usage, A. denoted the raising of the hand or foot in dancing, thus denoting the accented part of the metrical foot, and T. denoted the fall of the foot, and thus the unaccented part of the prosodial foot.

**Arsmetrik**, old term for arithmetic in Chaucer's Eng.

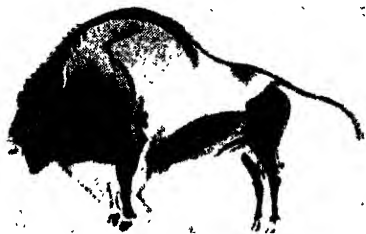
**Arson** (Lat. *ardere*, to burn). The malicious burning of a dwelling-house or outhouse of another. Under Rom. civil law it was punishable by death. In anct. laws of England it was known under the term *boeruet*. Under the Saxons it was punishable by death, and still remained a capital crime on the consolidation of the laws in 1827 and 1837. The Eng. law concerning A. was repealed and replaced by the Malicious Damage Act in 1861. By this Act A. was punishable by penal servitude for life or minor degrees of punishment. By the common law of A. it is required that some part of the house or other building be actually burnt. An attempt or intention does not constitute the offence, but the burning of any part, however trifling, is sufficient to complete the offence. If any person be in the house at the time of burning it is a capital offence.

Under the Malicious Damage Act of 1861 persons setting fire to any place of divine worship, dwelling-house, farmhouse, factory, outhouse, any public building, or setting fire to any place with intent to defraud any person, are liable to be sentenced to penal servitude for life,

or for any term not less than 3 years. Setting fire to crops is punishable by penal servitude for not more than 14 years.

In Scotland A. is known under the term *wulfil fire-raising*.

**Art**. There are 2 accepted definitions of the term *art*, neither of which entirely covers all that the word implies. One states it to be the *doing of a thing*, as opposed to the *knowing of a thing*, which the word *science* means, whilst the other embraces all that is not done by man in the way of utility; in other words, all that he does in the way of luxury or pleasure. There is evidence in the world's hist. to support the latter generalisation, for it is found that nations have produced the best A. in the years of prosperity, but that a time of great struggle, or a wave of commercial anxiety, has proved inimical.



E.N.A.  
SPANISH MURAL PAINTING OF THE  
MAGDALENIAN PERIOD

It is usual to go back to the first glimmerings of A. for a clue to the impulses that generated it. Although many modern thinkers see in primitive examples merely the desire to beautify the tool, the cave wall, or whatever surface received the decoration, others have doubts as to whether such efforts were not prompted by religious motives. M. Salomon Reinach points out that all animals represented in the Quaternary period are of the comestible kind, and he infers therefrom that the primitives practised their A. to propitiate the forces controlling their welfare. In the Sp. caves of this period are paintings of over a hundred animals of large size, invisible in the daylight. They must therefore have been executed by artificial light, and it is hard to suppose that such toil for such meagre spectacular result would have been undertaken with mere decorative intent. It has further been computed that the various phases of A. devoted to *teaching* occupy periods amounting to 10 times as many centuries as do those concerned with *pleasing*. The figures in Egyptian and Assyrian processions are mere symbols—a part of ceremonial or contemporary hist. The beginnings of Christian A. show again the use of symbolic figures for the same didactic purpose. Luxury and diversion were clearly not the impulse of

these manifestations, and yet it is impossible to deny that æsthetic ideas were in the minds of their authors. Granting that these pictured forms did teach, they must have done so by impressing the spectator; and where they propitiated they certainly must have pleased. A. can hope to do no more in the twentieth century.

The principles of æsthetics have become so much an essential part of all considerations of A. matters that it is *feeling* more often than *doing* which is implied now by the word *art*. 'So-and-so may be a clever painter, but he is no artist,' is a remark one often hears. It



'LANDSCAPE,' BY TURNER  
National Gallery, London.

derogates the particular painter's work to an early definition of A. when the As. were the trades, the tradesmen being artisans. But feeling alone no more fills the definition of A. than does manual skill alone. A. is only completely expressed when material is re-formed, re-created, re-fused by what R. L. Stevenson called 'the ardour of the blood' and what is known as the *divine afflatus*. The actual re-formation of the stone, metal, or pigment may fall short of the workman's ideal; but if it have realisation enough to frame and hand on the author's message, to show eloquently and appealingly that for which the mind and the heart of the author could find no other utterance, then that work is a work of A.

This 'message,' 'voice,' 'mood' of the work of A. was held by the classic mind to characterise everything under the ægis of the muses (of which *music* was once the adjective or generic term). Thus music, poetry, and the drama depend also upon A. for their perfection. The

industrial As. likewise may be more or less amenable to an exercise of taste making for luxury and diversion. Hence it is that whilst a farrier is not expected to make horse-shoes but in the approved way, the blacksmith working at the same forge may make a gate that one day might find its way into a museum of objects of A. Farriery therefore is not an A., but smithing perchance may be.

To avoid confusion between all such industries possibly amenable to the artistic sense on the one hand, and the higher activities on the other, wherein material is worked, changed, or put together, not for a utilitarian purpose, but solely to form a medium for the author's emotion, the latter are called by the name of the *Fine Arts*. This term is held to cover architecture, painting, and sculpture, but it does not extend, in common parlance, to music or letters. Possibly the difference at the root of this anomaly in nomenclature is that music and poetry exist in the abstract, and painting and sculpture in the concrete. That, however, would not prove that the former are any less fine as As. than the latter. The 'A. of architecture,' as a term, also offers a little difficulty, for whilst in its highest flights architecture may answer every requirement of a fine A., it is in its dual character almost always concerned with the immediate wants of life, which fact is enough to put it outside one definition of A. at least. Macaulay declared it was half a science, and others have decreed it to be more science than A. On the other hand, it is often regarded as the oldest and greatest of the fine As., for the reason that painting and sculpture are subsidiary to the buildings they adorn. But that is as much as to say that the ring is more worthy than the engraved gem it holds; and as for priority, we know that the graphic As. were flourishing before man began to build.

We are led to the conclusion that probably the part of architecture that is fine A. is in reality a variety of sculpture, for it works in 3 dimensions; its beauty and effect are due to design and proportion, and its surface markings count in the complete effect. These are conditions which sculpture beside alone fulfils.

Sculpture and painting remain with a standing against which there seems to be nothing to urge, and the popular idea of what fine A. signifies would appear to confirm this standing. More than ever do the conditions of the pursuit to-day prove them dependent upon the margin that a strenuous age can spare for luxury; notwithstanding the fact that the trades and industries called into being by their application to common needs are more numerous than ever.

All forms of graphic and plastic A. are admitted under the generic names of painting and sculpture, and are broadly divided as *naturalistic* and *decorative*. This div. is often no more than one of point of view, for it is obvious that the Parthenon frieze was both, as were the pictures of the Venetian masters. The various sub-divs. of fine A., such as the

*idealistic*, the *realistic*, the *literary*, and so forth, are necessary to lucid criticism, but they do not affect the question of A., for which all are mediums. The latest developments of naturalistic A. have rather forsaken the literary or story-telling phase, even in book-illustration, which is now more decorative than naturalistic in its best forms. But literary A. will always make a strong appeal to the popular mind, which naturally thinks first of anecdote, being more alive to the joys and woes of life than to the finer-drawn sensations of A. for A.'s sake felt by critics.

The terms *idealistic* and *realistic* are used in criticism to signify 2 opposite methods of approach on the part of the artist. The idealist is one who gives form to incidents and scenes that have generated partly or wholly in his own mind. He may, and usually does, get the germ of his subject from something seen, but the material is gestated, so to speak, and the result appears with more generalisation and psychological import than its actual prototype possessed. The realist, on the other hand, labours to give a likeness of the actual incidents, and if the scene is a beautiful one and lovingly presented, the work may rise to the highest position in fine A., as did some pictures by Holman Hunt and by Millais in his Pre-Raphaelite days. Turner would rank as the greatest idealist. In figure work the poles may be instanced by Watts on the ideal side, and by Melissonier on the real. Sculpture offers Phidias and Donatello respectively. But the case cannot be left so simply stated, because the 2 phases are, in a manner, combined in the finest works of A. It is evident that the idealist is really more in need of knowledge born of observation and study than is the realist, since the former does not oblige himself to copy from nature; and were he, moreover, not realist enough to carry conviction, his idealism would be but futile and meaningless. The more thoroughly a Turner could know the realities of sunsets and thunderstorms, the more magnificent or appalling could he render them by invention. It is the power of communicating the spiritual or romantic force of things to the spectator that constitutes idealism in A. The realist also might imagine scenes, but he would present them in such a way that they might be mistaken for topographical records. They might be beautiful examples of fine A., but they would not be ideal. Fine A. must interpret, however, and inasmuch as the spirit stirs more deeply than the letter, the idealist is in a better position than the realist to set up that correspondence of feeling between artist and beholder which fine A. demands.

Of decorative A. the great mass finds expression in the crafts and industrial A. Much of it takes the form of *ornament*. But mural painting and stained glass belong legitimately to the fine A. when they rise above the level of commercial mediocrity. Recent years have witnessed an increasing movement against natural-

ism, as being a phase antagonistic to the idea of the space decorated. The idea of this space, it is held, should not be forfeited to pictorial ideas. In the belief that such matters as linear and aerial perspective, round modelling, natural action, modulated colour, and other characteristics of realism, prevent the wall upon which they appear from looking like a wall, modern decorative artists have adopted archaism as a safeguard against the naturalistic view of things.



Alinari

WINGED VICTORY OF SAMOTHRACE  
Greek sculpture in the Louvre, P. 115.

The great decorative painters, Michelangelo, Veronese, Rubens, and others, strove, on the other hand, to eliminate the idea of the wall, and to that end represented starry heavens in ceilings, columns and openings in wall spaces, and gave to figures a perspective view from the floor. For the most part decorative A. shows signs of free growth only in sporadic efforts to burst the bonds of its conventions.

An altogether different view-point is, however, possible—namely, that which regards both the idealistic and the realistic approaches as belonging to the category of naturalistic A., and therefore as opposed to another conception of A. which stresses its abstract qualities; that is to say, the qualities which constitute design apart altogether from its relation to nature or the natural objects which it may represent. From that point of view the Egyptian lioness

in the Brit. Museum is better art than Landseer's lions on the Nelson Monument, and the Its. of the Renaissance, generally speaking, are better designers than the Flemish or Ger. artists of the period. Of recent years distinction between the naturalistic or representational and the purely æsthetical or abstract qualities of A. has become more and more emphatic, leading eventually to designs in sculpture and painting which show no or only barely discernible relations to nature or natural objects.



*Alinari*

**MERCURY, OR THE LITTLE IDOL.**

A bronze antique in the Archaeological Museum, Florence.

The hist. of A. overlaps the hist. of civilisation. Quaternary A. dates from 10 to 12 centuries before the Christian era. A gap then occurs until the polished Stone Age, some 4000 years B.C., when pottery and an elegance in the fashioning of tools bespeak taste. Personal ornaments having intricate linear decoration appear in the Bronze Age, when dolmens and cromlechs point to the dawn of architecture. A. in Egypt, which began c. 4000 B.C., had progressed far before bronze and iron were used, producing weapons and ornaments carved and engraved in ivory, gold, and other materials. The vast halls of Egypt with many columns, some of which were 70 ft.

high, were covered with coloured reliefs, and held colossal statues in 'the round.' Assyrian or Chaldean A. was contemporaneous, but its sculpture was almost restricted to bas-relief, although it had fewer conventions than the Egyptian. The most obvious of the latter was that its torsos were almost invariably at a front view, though combined with limbs and heads in profile. Assyrian sculpture was characterised by prodigious technical skill and by types of great muscularity and sturdiness. To this nation is due the invention of the vault and dome. About 3000 to 2000 B.C. Gk. A. rose in the Archipelago with rude representations of the human form. Next Crete became the centre of more realistic and elegant efforts. The palace of Minos at Cnossus—excavated by Sir Arthur Evans—yielded reliefs and paintings pointing to a very advanced civilisation. Schliemann excavated Troy, Mycenæ, and Tiryns, in which spots the evidences of the plastic genius of the period richly abounded. Mycenaean A., influenced by Egyptian and Assyrian, and developed by the Gk. love of life, grew with amazing rapidity into fine sculpture and painting. Of the latter no examples remain, but it is mentioned by Gk. authors in terms of high praise. By c. 450 B.C. Gk. genius, in the persons of Phidias, Polyclitus, and Myron, had risen to the high level evidenced by the frieze of the Parthenon. All archaism had been thrown off when Praxiteles, Scopas, and Lysippus added to the Phidian traditions greater facial expression and sweetness. The victories of Alexander closed the Hellenic period. From this time until the Rom. conquest the Hellenistic period extended. It added landscape to the scope of A., introduced human suffering, as in the 'Laocoon,' and combined realism with its magnificence of life and colour. That the Gk. was always a true artist every discovered object of common utility bears proof. Zeuxis, Apelles, and others were painters of whose work only 1 wreck exists; but decorated vases survive in plenty which show beauty of form and grace of invention. Engraved gems have come down to us unspoilt by time. They have never been surpassed for the perfection of their beauty and skill. The Romans, although they imported Gk. artists and pillaged Gk. soil for objects they had the taste to admire, were nevertheless possessed of a native A. which produced the viaducts, arenas, and other great works of utility. The Romans, like the Assyrians, made use of the arch and the dome. Their statues and reliefs are vigorous and realistic. Especially great are their vivid portrait busts. From the Rom. A. and architecture, influenced by oriental and Hellenistic art, evolved the Byzantine. The early Christian churches were modelled upon the Rom. basilica, and ornamented with mosaics stiff in design but gorgeous in colour. Byzantine A. avoided sculpture in 'the round' as appertaining to idols. Its carvings, embroideries, and enamels were coveted all over Europe, and the epoch was one of great wealth and magnificence.

The Rom. basilica, by the principle of the round and pointed arch, developed respectively into Romanesque and Gothic building. The Gothic, being the later stage, gave rise to a lively, human and intensely naturalistic sculpture, free from the conventions that always hampered the Romanesque.

The fourteenth century saw the first It. painter of genius, one Duccio, who appears to have annulled the claim of Cimabue to that honour. Giotto, the Florentine, was inspired by the naturalism of the Gothic masters. Masaccio, in painting, and Donatello, in sculpture, carried these new views further.

The Renaissance period dates from the fifteenth century, when classic remains recalled men to the older ideals. Its result in architecture was that every

are to-day greatly esteemed. The former are commonly credited with the invention of oil painting, which however, was practised as early as the twelfth century. Jan Van Eyck's portraits are unsurpassed as searching documents of character, Memling holding perhaps the second important place. The realism of the Flemings was associated later with It. idealism in the person of Mabuse and others; but Flemish A. as a whole dealt with realities which it endued with a poetry of its own. Germany showed no such early awakening. In the fourteenth century Wilhelm of Cologne heralded the line of masters, Schongauer and Holbein the elder follow. It is not until the sixteenth century that Germany, with Dürer and the 'Little Masters,' takes her due place. As an engraver Dürer manifested himself as the superior of all.



Anderson

A SOFFIT OF THE SISTINE CHAPEL BY MICHELANGELO  
Vadcan.

nation adapted the classic elements to its own special needs. Leonardo da Vinci, the most universal genius that ever lived, dominates the Renaissance together with Michelangelo and Raphael. The type of Leonardo's Madonna—which is that of the 'Gioconda'—became a pattern for less talented workers. Michelangelo was likewise a widely gifted genius, though pre-eminently a sculptor. The poetic grace of the human form in action was his passion, wherein he outdid the Gks. in the boldness of his ideas. His greatest work in painting is the ceiling of the Sistine Chapel. Raphael's works are well known. He has been called the 'divine painter' and 'the prince of painters,' and, though not quite so highly esteemed to-day, his sweetness and charm, his mastery and suavity, still command. In Venice painting was distinguished by rich full colour, and a joyous and free style of motive. It boasted the great names of Mantegna, Bellini, Giorgione, Titian, Tintoretto, and Veronese. Although the names of Flemish artists are not household words like those of Italy, yet Gothic A. had been foremost in achieving noteworthy sculpture and painting before Italy in the fifteenth century. Italy and Flanders influenced each other. The brothers Van Eyck, Matsys and others,

Holbein the younger was a portraitist of idealist tendencies, a consummate draughtsman, and a designer of exquisite fancy. After Michelangelo, Italy's artistic fire dwindled. Its traditions became an obsession, and nature was forgotten; but early in the seventeenth century Caravaggio set a new fashion of violent lighting. In Spain, Ribera, and after him Zurbaran, carried on this gloomy style which Velazquez hardly escaped. He, the glory of the Sp. school, was independent to the last degree. His masterpieces did not affect him. Murillo was blander and less direct. He did not profit by the adroit seizure of tonal values which Velazquez displayed. Protestant Holland in the seventeenth century had no call for religious works, but was prolific of portraits, genre subjects, and landscapes. Rembrandt, Hals, De Hooch, Ruysdael, Hobbema, Cuyp, and the Flemings, Vermeer, Rubens, and Van Dyck, are the names of some of the greatest men of this glorious epoch of healthy naturalistic A. Their characteristics are too well known to justify further space here. Under Charles II. Lely painted voluptuous portraits. In France, Louis XIV. dominated the seventeenth century, the A. of which was a decorative echo of his pomp. But Claude

and Poussin saved the period, the latter by his romantic landscapes filled with the glories of light. The eighteenth century returned to life and nature again. Watteau's charming *fêtes* are well known, as are also the galeties of Fragonard. In this century, too, the Brit. school developed a national A. heralded by Hogarth the moralist and satirist. He was followed by the great portrait painters Reynolds, Gainsborough, Hoppner, Romney, Raeburn, and others, Lawrence, in the early nineteenth century, representing the last of the tradition. Of equal importance, and perhaps more significant



Mansell

'ISABELLA OF PORTUGAL,' BY TITIAN  
Prado, Madrid.

consequence, were the Brit. landscape painters Wilson and Gainsborough in the eighteenth and Turner and Constable in the earlier part of the nineteenth century. The special glory of the Brit. school of this period, and apart from Turner and Constable, was the development of water-colour painting, of which latter Cozens, Girtin and Varley were the pioneers, Turner, Cox, De Wint, J. S. Cotman, Prout, Hunt, Müller, the Brit. representatives, with Callow and Birket Foster as their descendants.

Lawrence, Turner, and especially Constable led, after the collapse of the aristocracy, to the development of a bourgeois A. in France, where Delacroix became the protagonist of the Romantics, opposed to the classicists under the aegis of Ingres, who was a pupil of David; the latter a pupil of Greuze and a revolutionary who ended as the court painter to the Em-

peror Napoleon. The Romantic school—in its inspiration a European literary movement—had in the famous Barbizon school, which included Rousseau, Diaz, Troyon, Daubigny, Millet, and Corot, a separate branch which, in its turn, influenced through Courbet and Manet the Realistic conception and led to the development of the more or less scientific Impressionism. The term was derived from a title given incidentally to one of his pictures by Monet, their leader, and the 'school' included, by conventional use rather than strict principle, Camille Pissarro, Sisley, Berthe Morisot, Degas, and the Anglo-Franco-Amer. Whistler. Seurat and Signac represent their Neo-Impressionist offshoot.

Just as France possessed in Chardin in the eighteenth century a Fr. forerunner of the Impressionist school, so England possessed in William Blake a forerunner of Expressionism (*q.v.*). The Romantic movement of the Continent had in the Eng. Pre-Raphaelites, comprising Ford Madox Brown, Rossetti, Holman Hunt, and the earlier Millais, its somewhat belated counterpart. Amongst the Brit. Academic painters of the last century Etty, Hall, Watts, and Orchardson remain of some account, though Sidney Cooper, Lord Leighton, Marcus Stone, Peter Graham, Alma-Tadema, and the later Millais were the popular favourites.

Manet and the Fr. Impressionists exerted an important influence on European artists generally. Amongst them may be mentioned Israels, Mauvo, Mesdag, Jongkind, and the 3 brothers Maris in Holland; Liebermann in Germany; Segantini and Boldini in Italy; Sorolla in Spain; Krøyer in Denmark, etc. In Great Britain, Reid, Guthrie, Lavery, Stanhope Forbes, La Thangue, Sargent, officially an Amer., Clausen, Edward Stott, Wilson Steer, Augustus John, William Nicholson, Walter Richard Sickert, and Sir William Orpen are all more or less associated with this movement, as is also Frank Brangwyn, the first inspired by oriental travel to break away in England from the optical accuracies of the Impressionists, and, next to the Frenchman Puvis de Chavannes, the most important decorative painter of his age.

The decorative qualities of far E. A. had, however, been recognised already as far back as the sixties of the last century, when Jap. colour prints (*q.v.*) first began to arrive in Paris, there creating a veritable furore and modifying the Impressionists' method of design. It may be seen, for instance, in Whistler's 'Battersea Bridge,' now in the Tate Gallery, and it had a powerful effect on the principles of modern design as seen in the evolution of posters and decorative A. It is also here to be noted that photography and the far greater facilities of travel and transport which steam power made possible completely revolutionised the older conception of aesthetics. Discoveries of the A. of primitive peoples, e.g. in Africa and Australasia, and past civilisations, e.g. in Troy, Crete,



Mesopotamia, Egypt, India, Turkestan, Peru, and Central America, made it abundantly clear that the Renaissance ideals and the views of the eighteenth-century aestheticians founded on the excavation of Pompeii and Herculaneum were no longer tenable, since everywhere new forms of aesthetic value were encountered or unearthed.

The greatest individual influence in the resultant revolt against academic, idealistic, realistic, and impressionistic naturalism was, however, that excited, albeit quite unwillingly, by Cézanne

being founded upon natural forms, whilst the last rests pre-eminently on the artist's autonomous creative will. It is essentially the art of the twentieth century. So far as Cézanne experimented in geometry he did so within the organic forms of nature. He reacted against the vagueness and volatility of Impressionism by striving after a spiritual and sensual view of life that aims at a compromise between the temporal aspect of things and the timeless character of existence; and it is evident that his A. deeply influenced such painters as Braque, Juan



'LE PONT DE CRETAIL,' BY CÉZANNE

Villard

This painting was formerly known as 'Le Pont de Melun.'

(*q.v.*), who, himself originally an Impressionist, aimed at combining Impressionistic truthfulness of light, colour, and tone relations with firmly constructed designs such as is found in the classical compositions of Nicolas Poussin. The movement thus started by Cézanne has been conveniently named Post-Impressionism (*q.v.*). The Post-Impressionistic developments have known many different and sometimes contradictory aims, but they have nevertheless one thing in common; they all regard the work of A., whether it be sculpture or painting, primarily as a reality, and not as an illusion or a counterfeit of nature. In this sense there is a sharp cleavage between academic, idealistic, realistic, romantic, and Impressionistic A. on the one hand, and Post-Impressionistic A. on the other, all the former categories

Gris, Léger, and Picasso, as well as the abstractions of the Cubist movement. Picasso, like other artists in revolt from ultra-realism, seeks a philosophy of cubism; at his best he is semi-abstract but none the less organic, at his most extreme, flat and mechanistic. Abstract geometric A. judging from the cave paintings of S.W. Europe, is as old as A. itself. 'The first abstract art is comparable with the extreme geometric abstractions of our own day and the most notable cave-paintings are comparable with the new painting of such artists as Miro and Héliou which seems to be reverting to figured forms through a new semi-abstract' (Geoffrey Grigson). These comparisons are valid if we agree with Picasso, who has said that 'at the source of all painting one will always find a vision subjectively organised, or an

illumination inspired as was that of Rimbaud.' Surrealist painting is an attempt, like surrealist literature, to represent and interpret the phenomena of dreams or the like experiences; but surrealist painters, such as Dalí and Ernst, are, in the eyes of their neo-plasticist opponents, mere literary realists, though Picasso, apparently of the latter school, has in some of his work obviously seized on the more vital possibilities inherent in surrealist expression in modern painting. Whether A. in its modern form will eventually prove more acceptable to more people than at present is problematical; though on this it has been well said that the kind of A. which those of the most finely sharpened senses will most enjoy is 'not art of a frigid, geometric, mechanical idealism, but that viable art, that viable sculpture and painting with an organic intensity, with a contained energy of its own which had produced abroad the succession from Brancusi (idealist sculptor) to Miro, in England by the few such as Wyndham Lewis and Henry Moore' (Geoffrey Grigson). Among the most important 'modern' painters are Gauguin and Van Gogh, who with Cézanne belong to the nineteenth century. Munch (Expressionist), Henri Matisse (Fauvist), Picasso (Cubist), Severini (Futurist), and a whole host of the younger living generation.

In Russia Bolshevism has developed, out of Fr. Cubism and Ger. Expressionism, a purely abstract and political A. serving the purpose of its political aims.

Sculpture (*q.v.*) has also undergone an evolution parallel to that of painting. It began in the nineteenth century with the classicism of Canova, Thorwaldsen and Flaxman, had in the middle of the century Alfred Stevens and later Alfred Gilbert as the imitators of the Renaissance, whilst the most famous sculptor of the century, Rodin, may be regarded as an Impressionist. In the nineteenth century Bourdelle stands for a kind of Rodinesque Gothic Romanticism, Mestrovic for a Serbian National Romanticism, Maillol for Neo-Classicism, whilst Archipenko, a Parisian Russian, and Brancusi represent Post-Impressionism in its most abstract sense. Epstein forms a school in himself.

**Bibliography.**—S. and R. Redgrave, *A Century of British Painters*, 1866 (revised ed. 1948); G. Gilbert Scott, *Rise and Development of Medieval Architecture*, 1879; H. Janitschek, *Geschichte der Deutschen Malerei*, 1890; E. Corroyer, *History of Gothic Architecture*, 1893; H. Balfour, *The Evolution of Decorative Art*, 1893; A. Furtwängler, *Masterpieces of Greek Sculpture*, 1895; E. Gardner, *Handbook of Greek Sculpture*, 1896; R. Muther, *History of Modern Printing*, 1896; Arthur Evans, *Annals of the British School at Athens*, vols. vi.-x. (London), 1899-1904; Lady Dilke, *French Architects and Sculptors of the Eighteenth Century*, 1900, and *Journal of Hellenic Studies*, vol. xli., (London), 1901; W. Ridgway, *The Early Age of Greece*, 1901; B. Berenson, *The Study and Criticism of Italian Art*, 1901-

1902; L. F. Freeman, *Italian Sculptors of the Renaissance*, 1902; W. Budge, *Egypt in the Neolithic and Archæic Periods* (London), 1902; R. C. Witt, *How to look at Pictures*, 1902; H. Wölfflin, *The Art of the Italian Renaissance*, 1903; C. Mauclair, *The French Impressionists*, 1903; L. Dimler, *French Painting in the Sixteenth Century*, 1904; C. G. Hartley, *A Record of Spanish Painting*, 1904; C. S. Ricketts, *The Prado*, 1904; W. R. Lethaby, *Medieval Art*, 1904; J. Capart, *Primitive Art in Egypt* (London), 1905; Richter and Taylor, *The Golden Age of Classic Christian Art*, 1905; S. Reinach, *Apollo* (hist. of A. through the ages) (London), 1907; E. Fromentin, *Masters of Past Time* (trans.), 1912; J. A. Crowe and G. B. Cavalcaselle, *A New History of Painting in Italy*, 1918; Charles Marriott, *Modern Movements in Painting*, 1920; Roger Fry, *Vision and Design*, 1920; Frank Rutter, *Evolution in Modern Art*, 1926; A. Venturi, *A Short History of Italian Art*, 1926; S. Sitwell, *German Baroque Art*, 1927; R. H. Wilenski, *The Modern Movement in Art*, 1927; A. Clutton-Brock, *An Introduction to French Art*, 1931; O. E. Saunders, *English Art in the Middle Ages*, 1932; Herbert Read, *Meaning of Art*; *Art Now*; *Henry Moore*, 1934; Geoffrey Grigson (ed.), *The Arts To-day*, 1935; L. Ashton and B. Gray, *Chinese Art*, 1935; D. T. Rice, *Byzantine Art*, 1935; G. Scott-Moncrieff (ed.), *The Stones of Scotland*, 1938; J. Lipman, *American Primitive Painting*, 1942; K. De B. Codrington, *Study of Indian Art*, 1944; T. Bodkin, *The Approach to Painting*, 1946; L. Venturi, *Modern Painters*, 1947; J. Rewald, *The History of Impressionism*, 1947; C. G. E. Bunt, *Russian Art*, 1947.

**1. Exhibitions.**—Whether organised for profit or otherwise, A. exhibitions in Britain have become increasingly popular in modern times. A. galleries are always open in London with private shows of the works of artists who are offering them for sale; while, in recent years, public interest in continental Art has been stimulated by representative exhibitions of Flemish and Dutch pictures in 1927 and 1929, and of It. A. in 1930 at Burlington House. The late Lord Duveen, a great patron of art, founded the *Brit. Artists' Exhibitions* for the purpose of increasing the sales of the works of Brit. craftsmen, and had such works exhibited in the art galleries of Leeds, Birmingham, Manchester, Bradford, Belfast, Plymouth, Liverpool, and Glasgow, on the Continent of Europe, and in S. America. He even exhibited pictures on the *Bjerggaard*, and in 1928 sold one-third of the 300 works shown on a voyage to New York and back. In 1937 an important exhibition of pictures by Sir Joshua Reynolds was held at the house of Sir Philip Sassoon in Park Lane, and was only rivalled in popularity by an exhibition in the same year of landscapes by Constable at the Tate Gallery.

The most popular ann. exhibition is that of the *Royal Academy of Art*, first held in Pall Mall in 1768, and afterwards in Burlington House, where the 180th

summer exhibition was held in 1948. The exhibits include oil paintings, water-colours, designs in architecture, miniatures, engravings, etchings, and sculpture.

*The Royal Society of Painters in Water-Colours* ('Old Water-Colour Society'), Pall Mall, exhibits works of its members and associates in the spring and autumn of each year; the *Royal Institute of Painters in Water-Colours*, 195 Piccadilly, exhibits annually works of any artists selected by their committee. In the same building the *Royal Institute of Oil Painters* gives exhibitions in the autumn on the same principle. *Royal Society of Brit. Artists*, Suffolk St., S.W., exhibits works of outside artists as well as of members; *Royal Society of Painter-Etchers and Engravers*, 5a Pall Mall, exhibits yearly works of its members and associates; *Royal Society of Portrait Painters*, founded in 1891, with a limited membership, selects works of members and non-members. Ann. exhibitions of the *New Ing. A. Club* are held at New Burlington Galleries, W., and consist of works which the artists have felt to be outside the usual scope of those of other exhibitions.

*The Royal Scottish Academy of Painting, Sculpture, and Architecture*, Princes St., Edinburgh, held its 113th exhibition in 1939; the *Royal Hibernian Academy of As.*, whose buildings in S. Frederick Street, Dublin, were destroyed in the Sinn Féin rebellion of 1916, also holds exhibitions; and in Wales the *Royal Cambrian Academy of As.* exhibits in Conwy.

Other well-known galleries with frequent exhibitions in the provs. are the *Royal Glasgow Institute of Fine A.*, the *Royal W. of England Academy*, *Royal Birmingham Society of Artists*, and the *Walker A. Gallery* of Liverpool.

*A. Museums.*—As a nation Britain is rich in the possession of many notable A. treasures, the greatest of which are to be found in London. Some of these are: *The Brit. Museum*, Great Russell Street, W.C.1., which contains a vast collection of ancient sculptures from Rome, Greece (including the Elgin Marbles) and Egypt; goldsmiths' and jewellers' work; ancient pottery; a fine collection of paintings, drawings, engravings (notably some of Albert Dürer), and etchings, located in the print room presided over by Arthur E. Popham, and a unique selection of Chinese paintings collected by Laurence Binyon. *Victoria and Albert Museum*, South Kensington, S.W.7., a large building of great importance to the student, with a well-stocked library on A.; its numerous exhibits are classified according to their materials, exemplifying the use of A. as applied to industry. *The National Gallery*, Trafalgar Square, W.C.2, contains numerous priceless works of the old masters of the It., Flemish, Dutch, and Brit. schools. The *National Portrait Gallery*, adjoining this building, is an interesting gallery of portraits of Brit. celebrities of various centuries. *The Tate Gallery* (National Gallery of Brit. A.), Millbank, S.W.1, is noted for examples of recent Brit. A. *London Museum* Lancaster House, S.W.1, con-

tains arts and crafts of prehistoric, Rom., and Saxon times in the London dist., together with topographical pictures of London. *Hampton Court Palace*, on the Thames, has many beautiful It. pictures and some very rare tapestries. *The Wallace Collection*, Manchester Square, W.1, in addition to its exquisite paintings of Brit. and continental schools, has a treasury of beautiful furniture. *Sir John Soane's Museum*, Lincoln's Inn Fields, W.C.2, is celebrated chiefly for its Hogarth paintings, while *Kenwood House*, Hampstead, N.W.3,



Mansell

'PORTRAIT OF THE ARTIST'S WIFE,' BY  
JAN VAN EYCK  
Flemish School, Bruges.

bequeathed to the nation by the late Lord Iveagh in 1927, is another example of a private house converted into a museum, with a small but valuable collection of pictures. At the Dulwich Gallery there is a collection containing sev. Murillos and valuable pictures from the Dutch school.

Among the provincial A. museums are the *Walker A. Gallery*, Liverpool, famous for its Pre-Raphaelite paintings, its etchings and sculptures, and its Eng. A. of the Middle Ages; the *Manchester Corporation A. Galleries*, with many fine examples of nineteenth-century Brit. artists; the *Birmingham Museum and A. Gallery*, with many representative works of the pre-Raphaelites. The *Bristol A. Gallery* was presented to the city by Sir William Wills in 1905. *Nottingham Castle*, which had been practically destroyed by fire, was restored in 1878 and turned into an A. museum; and the *Leeds Corporation A. Gallery*.

In Scotland, Ireland, and Wales there are fine museums and A. galleries in Edinburgh, Dublin, and Cardiff respectively.

The U.S.A. is becoming an increasingly important centre of A., due to the great benefactions of her millionaires. Thus in recent years the Metropolitan Museum of A. in New York City, which was already one of the great museums of the world, has been enriched by legacies of their entire A. collections by the late Benjamin Altman and Henry Frick. In each case, these gifts were estimated to be worth 25 million dols. There were



Anderson

'THE VISIT OF MARY TO ST. ELIZABETH,'  
BY GIOTTO  
In the Scrovegni Chapel, Padua.

thus added to the museum some of the finest specimens of the work of Rembrandt, Hals, and other masters. The Hispanic Museum in New York, which specialises in modern Sp. paintings, has far more specimens of those modern masters, Sorolla and Zuloaga, than any museum in Spain or even in Europe generally. Through the gift of a Detroit millionaire, Washington, the cap., has a separate A. gallery in which there are housed more specimens of the work of Whistler than are to be found elsewhere. There are also fine A. collections in Boston, Philadelphia, Chicago, Cincinnati, Toledo, and Cleveland.

On the Continent Italy has the greatest wealth of art treasures, Rome and Florence containing not one but many museums of the best It. A., while Venice, Naples, Milan, and other tns. possess their great galleries. In Belgium the finest gallery is in Brussels; in Denmark,

Copenhagen; in France, Paris; in Germany (before the Second World War) in Berlin, Dresden, and Munich (little remains in Berlin and the famous Zwinger of Dresden was reduced to a shell); in Greece, Athens; in Holland, Amsterdam; in Norway, Oslo and Bergen; in Russia (before 1941) Leningrad; in Spain, Madrid; in Sweden, Stockholm; in Switzerland, Zürich.

**A. Sales.**—The change in social conditions in England during the last few years has had a notable effect on A. sales. The maintenance of mansions or ancestral homes having become increasingly burdensome, through economic stringency and high taxation, heirlooms have been sold for the high prices they have been able to command. These sales often attract public attention, partly on sympathetic grounds and partly through excitement roused by Amer. competition. This rivalry in A. collection existed in pre-war days, but not to so great an extent. Yet there were some very notable sales before the war; e.g. Lord Duveen paid £1,000,000 in 1907 for the Rodolphe Kann collection of pictures and *objets d'art*, including a dozen splendid Rembrandts. In the following year the Holland sale realised £138,000 for some 400 lots, which was a record sum for a collection of paintings by modern artists. In 1910 the Yerkes sale in America brought in over 2,707,000 dols., including the sum of 137,000 dols. from Franz Hals's 'Portrait of a Woman'; and the E. H. Gary sale brought in 2,297,000 dols., including 270,000 dols. for Gainsborough's 'The Harvest Wagon.' Mantegna's 'Madonna and Child' sold for £31,000 in 1912 in Berlin, and about the same time Rembrandt's portrait of his son Titus was sold in the U.S.A. for 270,000 dols. In 1915 and 1916, during the early part of the First World War, there was naturally a 'slump' in the sale of heavily priced pictures, though in 1917 Reynolds's portrait of Lady Ann Fitzpatrick as 'Sylvia' was sold for nearly £20,000. But after the war prices soon began to rise and, in 1919, the Hamilton picture sale brought in £169,000, including £8,500 for Turner's drawing of 'Zürich' and £26,700 for Hals's portrait of Joseph Coymen. The sale of Sargent pictures in 1925 showed a total of £146,000 for 160 lots in one day, but sentiment played some part in the sale. But in 1923 the total sum at the auction of the pictures of Sir John Robinson was only £200,000, though the lots included over 100 old masters, numbers of them falling to reach the reserve price. In 1927, however, a record was created in that more than 130 pictures priced at sums exceeding 1400 guineas each had changed hands during the year.

In recent years the paintings which have realised the highest prices at auction sales have been mainly portraits by Rembrandt, Gainsborough, Romney, Hoppner, Van Dyck, Reynolds, and Raeburn. But there is also an increasing demand at the present time for paintings by such Fr. masters as Cézanne, Corot,

and Manet, and the Dutch painter, Van Gogh, though of course these do not fetch the extraordinary prices realised by the old-estab. masters. Probably the record figure for any picture was that obtained by Lady Desborough for the Cowper 'Madonna' by Raphael, the price being about £175,000. The 'Cornaro' Titian, bought for the nation from the duke of Marlborough for £120,000, also ranks very high in the list of the record prices. In the private sale of the duke of Westminster's collection was included Gainsborough's 'The Blue Boy,' which was sold for the Huntington collection of California for well over £100,000, while in the same sale Reynolds's 'Mrs. Siddons as the Tragic Muse' was sold for little less than £100,000. The 'Blue Boy' was actually bought in 1803 by John Hoppner for £65, having been sold 7 years earlier for half that price. Up to that time the highest price at any auction for a Gainsborough picture was £20,000 which was paid for 'The Market Cart.' In 1926 Gainsborough's portraits of Miss Tatton and Master Heathcote each fetched £46,000. £100,000 was paid by a Philadelphian buyer for Lord Lansdowne's 'Mill' by Rembrandt, and the same sum was realised for Franz Hals's 'The Artist's Family.' Reynolds's portrait of Lady Betty Compton, and the portrait of King Philip IV by Velazquez. Other high prices include the following: Gainsborough's 'Hon. Ann Duncombe,' £84,000, and the same painter's 'Harvest Wagon,' £72,000 (resold in America in the Garry collection); Holbein's 'Duchess of Milan,' bought for the nation for £82,000; 'A Spanish Statesman' by Velazquez, £80,000; the portrait of Mary M. Barrett (known as 'Dinkie') by Lawrence, 74,000 guineas; Piero della Francesca's 'Crucifixion'—a small wood-panel—£75,000; Romney's beautiful portrait of Mrs. Davenport, £60,900; Rembrandt's 'Man Holding a Scabbard,' 48,000 guineas, the Rokeby 'Venus and Cupid,' by Velazquez, bought for the nation, for £45,000; Van Dyck's 'Portrait of Anton Triest,' £29,000; Gainsborough's 'Anne, Countess of Chesterfield' and Van Dyck's portrait of Jacques de Roy, each 17,000 guineas; Hobbema's 'Woody Landscape,' £15,750; and Hals's 'Portrait of a Gentleman,' £9,000. These 2 last-mentioned prices illustrate the capriciousness of taste in some cases, for Hobbema's picture was sold in 1890 for £3400 and again, in 1938, for 3500 guineas, while that of Hals changed hands in 1884 for 4 guineas. The Eng. National Gallery secured Raphael's 'Anselmi Madonna' in 1885 for only £70,000 from the duke of Marlborough, while J. Bache, a New York banker, paid £120,000 for the sole example of a male portrait by the same master. In 1947 a set of 12 floral studies by Jacob van Huysum, painted in the eighteenth century for a comparatively modest fee, was sold for £13,500. See also 'CHRISTIE'S.'

The leading sales rooms in London are Christie's, St. James's Place, S.W.; Sotheby's, New Bond Street, W.; Robin-

son & Foster, Queensberry Hall, S. Kensington, S.W.; Puttick & Simpson, New Bond St., W.; and Knight, Frank & Rutley's, Hanover Square, W. Details will be found in the ann. vols. of *Art Prices Current*, and in *The Year's Art*.

Arta, a tn. in Greece in the prov. of A. It derives its name from the R. A., on which it stands. This riv. was, before the Balkan war of 1912, the frontier between Greece and Turkey. A. has many fine buildings, among which are a Byzantine castle; a palace belonging to the Gk. metropolitan; the church of the Virgin of Consolation, built in 819, and many fine mosques and synagogues. Chief manufs. are woollens and cottons, embroidery, Russian leather. Soil is fertile, and gardens and orchards surround the tn. In 1083 it was taken by Bohemund of Tarentum; 1449 taken by the Turks; 1798 Ali Pasha captured it from the Fr.; 1881 ceded to Greece. In Greco-Turkish war of 1897 it was the scene of many slight Gk. successes. Pop.: prov. 52,600; tn. 8000.

Arta, Gulf of, an arm of the Ionian Sea. It is about 23 m. long. Until the Balkan war of 1912 its N. shores belonged to Turkey and its S. to Greece. Fish are plentiful, especially eels, mullets, and soles. On its shores are ruins of many ant. castles.

Artabanus, name of a number of Persian princes, soldiers, and statesmen. The name was also borne by 4 Parthian kings.

One A. was a brother of Darius I., and trusted adviser of Xerxes, his nephew. Another was vizier to Xerxes, whom he murdered in 465 B.C.

The Parthian king A. I. (c. 127 B.C.) perished in battle against a Mongolian tribe.

A. II. (d. c. 40) made king by those Parthian nobles who rejected Vonones, the Rom. nominee, who fled to Armenia. When A. invaded Armenia, Tiberius prudently sent Germanicus to patch up peace. Later, Tiberius, at the instance of the Parthian opponents of A., sent Vitellius to restore Rom. authority in the E. A. eventually concluded a treaty with Vitellius and renounced the throne. Consult Tacitus, *Annales*.

Artabazus, the name of sev. distinguished Persians under the achæmenidean dynasty. An A. led the Parthians when Xerxes advanced against Greece. Another was general under the Persian King Artaxerxes II. He afterwards revolted against Artaxerxes III., but was forgiven. He was made satrap of Bactria.

Artagnan'd', the hero of three of Dumas's novels, *Les Trois Mousquetaires*, *Vingt Ans après*, and *Le Vicomte de Bragelonne*. He is drawn as a Gascon adventurer who goes to Paris to win his fortune, aided by his 3 friends, Athos, Porthos, and Aramis. The historical count d'Artagnan, Charles de Batz de Castelmor (1611-73), was captain in the guards in 1654, sous-lieutenant in the musketeers in 1657, capitaine-lieutenant in 1667, and maréchal-de-camp in 1672.

Artamenes. *Artamènes* ou *le grand Cyrus*, is the title of one of the novels

of Madeleine de Scudéry. It is in 10 vols., and appeared from 1648 to 1653. The character of Sappho, in vol. x., is autobiographical.

**Artanthe elongata** is a shrub of the natural order Piperaceæ, a native of Peru, remarkable for the styptic property of its leaves, which are used for stanching wounds.

**Artaxerxes I.** (465-424 B.C.), son of Xerxes, king of Persia. He slew his elder brother Darius on suspicion of his being guilty of the murder of his father. A. then ascended the throne in 465 B.C. In his time peace was restored between Persia and Athens after a war of 51 years.

**Artaxerxes II., Mnemon** (405-350 B.C.), king of Persia, succeeded his father Darius II. His reign is marked by the revolt of Cyrus, his younger brother, who was assisted by 10,000 Gks., and was defeated at Cunaxa in 401. The peace of Antalcidas terminated the wars with the Gks.

**Artaxerxes III., or Ochus** (359-338 B.C.), king of Persia, succeeded his father, A. II. He murdered 2 of his brothers, and afterwards put to death all the remaining branches of the family. In Egypt he slew the sacred bull Apis and gave the flesh to his soldiers. His eunuch Bagoas poisoned him, and gave his carcass to the cats.

**Artaxerxes, Bebeban** (A.D. 223-240) (in Persia, *Ardashir*), king of Persia, founder of the dynasty of the Sassanidæ, was the son of Babek and grandson of Sassan. Defeated his predecessor Artaban, the last of the Arsacide, and had himself proclaimed king of kings. He restored the old religion of the Magi, made new laws, provided for their administration, and for the education of the people, and then undertook to extend his dominions. War with the Roms. broke out in 232. After fighting for 5 years without gain for either side, peace was made.

**Artedi, Peter** (1705-35), a distinguished Swedish naturalist, was b. at Årund in Angermanland, Sweden, and was drowned in a canal at Amsterdam. He went to the univ. at Upsala, where he was a fellow student with Linneus. He first studied philosophy and theology, but gave up these studies for medicine and natural hist., especially the study of fishes. In 1734 he came to London, where he wrote the preface to his *Ichthyologia*, which work took sev. years to complete. He assisted Linneus in his *Systema Naturæ*, and Albert Seba in his work on natural hist. His works, including *Ichthyologia* and *Synonymologia*, were pub. by Linneus in 1738.

**Artemidorus**: 1. Of Ephesus, a geographer who lived about 100 B.C. Studied at Alexandria and travelled much. Pub. a work on general geography as a result of his investigations. 2. A soothsayer and dream-interpreter who lived about the second century A.D., during the reigns of Hadrian and Antoninus. Called himself *Daldianus*. His work on interpretation of dreams is said to have been written by command of Apollo Daldianus.

The work is in 4 books, and gives a valuable insight into anct. superstitions.

**Artemis**, in Grecian mythology, the goddess of the moon and of hunting, called by the Roms. *Diana*. She was the daughter of Zeus and Leto, and twin sister and counterpart of Apollo. She was b. at Delos, and is thus often called *Ortygia*, from the anct. name of the is. She is represented as being armed with bow and arrows, dealing out death to mortals as punishment for offences against herself and against morality. She is the goddess of chastity, the protectress of youths and maidens, and defies the power of love. She slew Arion for an insult to herself, and transformed Actæon into a stag because he witnessed her bathing. (1) According to Arcadian and Athenian legend she is looked upon first and foremost as the goddess of nature. To her influence the increase of the fruit of the fields is due. She is the goddess of agriculture. She drives away the corn-spirits, is the friend of reapers, and requires her share of the first-fruits. (2) Another view of the original character of A. is that she was the moon goddess. This is probably due to the fact that, as Apollo was identified with the sun god, Helios, it happened as a natural conclusion that A., his counterpart, should be identified with the moon-goddess, Selene. (3) She is also represented as goddess of the nymphs, hunting in the Arcadian mts., seated in a car drawn by 4 stags with golden antlers. By the Roms. A. was identified with *Diana*, a goddess of light, corresponding to *Dianus*, or *Janus*, a god of light, the sun. In art A. is represented as a young and beautiful huntress, modestly attired in the chlamys, with legs bare below the knees. She carries a bow and a quiver of arrows, and is attended by dogs or stags. As the moon goddess she wears a long robe; her head is covered by a veil, and above her brow is the crescent of a moon. The statue, '*Diana of Versailles*,' now in the Louvre at Paris, is an artistic and anct. piece of sculpture.

**Artemisia**, a genus of *Compositæ* very common in N. countries, has many species noted for their bitterness. *A. vulgaris* and *A. campestris* are well-known Brit. species; *A. abrotanum*, old man or southernwood, has a peculiar aromatic scent, and is found in S. Europe and the E.; *A. absinthium*, the wormwood, has valuable medical properties, and grows wild in Britain; *A. dracunculul*, the tarragon, has succulent leaves used in vinegar, and is found in Siberia.

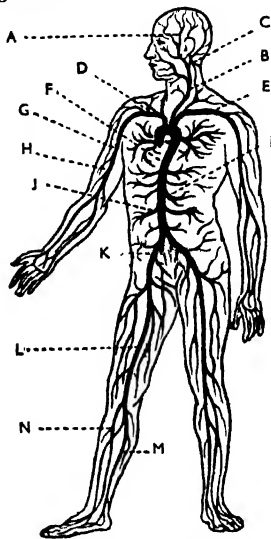
**Artemisia**: 1. Queen of *Halicarnassus* in Caria, one of the allies of Xerxes at the famous battle of Salamis, 480 B.C. 2. Another queen of *Halicarnassus*, wife and successor of Mausolus (352-350 B.C.). She is noted for her love to him, the extraordinary grief with which she mourned his loss, and the magnificent monument which she built to his memory. This monument, called the *Mausoleum*, was adorned with fine Gk. sculptures, portions of which were discovered in 1857 and are now in the Brit. Museum.

**Artemisium**, in anct. geography, a cape of N. Eubœa, Greece, off which a famous naval battle was fought between the Gks. and the Persians in 480 B.C.

**Artemus Ward**, see BROWNE, C. F.

**Arterio-sclerosis**, see ARTERY.

**Arteriotomy**, the cutting or opening of an artery for blood-letting purposes. It is only advocated where it is required to deplete the cerebral circulation to a considerable extent, and the temporal artery or one of its divs. is always selected. When sufficient blood has been let, the artery is completely divided and the ends are ligatured.



ARTERIAL SYSTEM

A, temporal artery; B, carotid artery; C, vertebral artery; D, E, subclavian artery; F, aorta, or great artery; G, axillary artery; H, brachial artery; I, celiac artery; J, renal artery; K, iliac artery; L, femoral artery; M, posterior tibial artery; N, anterior tibial artery.

**Artery**, one of the tube-like vessels through which the blood is propelled by the heart to all parts of the body. They consist of sev. coats; the outer, or *tunica adventitia*, composed of connective tissue; the *yellow elastic coat*; the *muscular coat*; the *elastic penetrated coat*, which is perforated by small apertures; and the *tunica intima*, composed of endothelial cells. The walls undergo degeneration in cases of *arterio-sclerosis*, the elastic coats are destroyed or greatly impaired, and the other walls are thickened. This loss of elasticity involves an increased resistance to the blood current, and consequently increased strain on the heart. The disease is caused by the toxins of malaria, rheumatism, and syphilis; by

chronic alcoholism and lead poisoning; by over-strain and over-eating; and as secondary to Bright's disease. The other chief affection of the As. is *aneurism* (q.v.).

The *aorta* is a large A. rising from the left ventricle of the heart, curves round in an arch, proceeding downwards until it bifurcates into the right and left *iliac* As. The head, neck and upper limbs are supplied by the *innominate*, which divides into the *right common carotid* and the *right subclavian*; the *left common carotid*; and the *left subclavian*. The carotids supply the organs of the head, and the subclavians passing through the armpits are called *axillaries*, *brachials* as they pass down the upper arms, bifurcating into the *radial* and *ulnar* As. in the forearms. Branches are given off from the aorta to supply the tissues of the heart and the viscera of the abdomen. The *iliac* bifurcates into the *internal iliac*, supplying the pelvic viscera, the organs of generation, etc., and the *external iliac*, which becomes the *femoral A.* as it descends the thigh, runs to the back of the limb, where it is called the *popliteal A.*, bifurcating into the *anterior tibial* and the *posterior tibial* As.

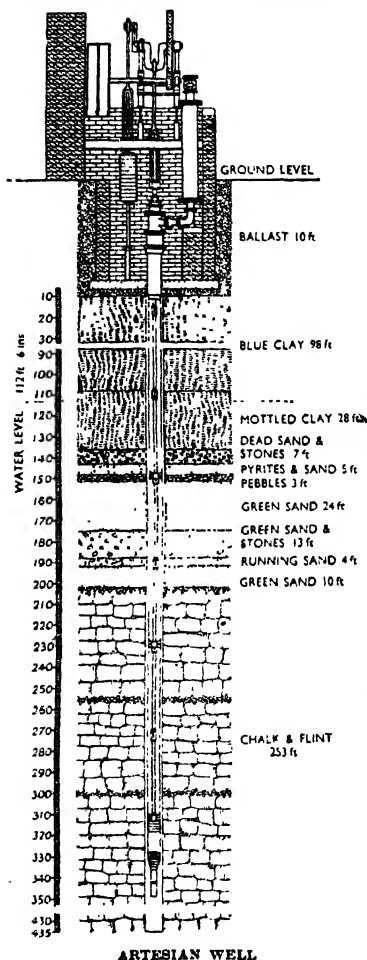
The *pulmonary A.* springs from the right ventricle of the heart, and bifurcates into branches for supplying the right and left lung with blood.

**Artesian Wells**, perpendicular borings in the ground through which water rises by natural hydrostatic pressure from water-bearing strata. The name owes its origin to the province of Artois, in France, where their use has been long estab.

The strata composing the earth's crust may be divided into 2 classes, permeable and impermeable, according to whether they allow water to pass through or not. Examples of the former class are sand and gravel, and of the latter, clay and hard rock. Water naturally tends to find the lowest level, therefore streams flowing over impermeable strata collect in hollows to form lakes or find their way to the sea. Suppose, however, that there is an outcrop of permeable strata lying between 2 impermeable layers. The water which falls on the outcrop sinks down as low as possible in the porous layer. There then occurs a condition which may be illustrated by holding a basin inside a larger one with the space between the two filled with water. If the inner basin is perforated at points fairly low down, the water issues with some force. Therefore, when a hole is bored through impermeable strata to reach the accumulation of water in the porous layer, the pressure is often sufficient to force the water to the surface, or at any rate to within pumping distance.

A. W. are of great value when the supply of surface water is insufficient. In Queensland and S. Australia the scanty rainfall is often supplemented by water drawn in this way from great depths. Water-courses that usually run dry in summer have been converted into permanent streams by the surplus from these wells, and it is estimated that the yield

in Queensland is equivalent in irrigating effect to a yearly rainfall of 12 in. over 110,000 sq. m. The water obtained from A. W. naturally contains many mineral salts in solution, and so may be unsuitable for washing or certain manufs., but



the general absence of organic impurities makes it valuable for drinking purposes. In some dists. of the Atlantic coast plain in the U.S.A., the development of A. water supply has promoted a marked improvement in public health.

Many A. W. over 300 ft. deep have been sunk in London, such as those which

supply the fountains in Trafalgar Square. In the neighbourhood of Paris the borings are often much deeper. At Grenelle a well 1798 ft. deep was sunk, the operations lasting from 1834 to 1841. In America many wells are over 2000 ft. deep, and in Putman Heights, Connecticut, there is one 6004 ft. deep.

Occasionally it is found that the water from A. borings is salt or brackish, and invariably the temperature is higher than that of surface water; there appears to be a rise of 1° F. for every 55 ft. of descent down to 1800 ft., after which the rise is more rapid.

Artevelde, Jacob van (c. 1300-45), the celebrated brewer of Ghent, who became governor of Flanders. On the occasion of a revolt against Count Louis in 1388 he was chosen chief of the insurgents. He afterwards united with Edward III. against the king of France and assisted at the siege of Tournai in 1340. In the truce which followed he stipulated the independence of Flanders, and became its governor. He applied himself to his difficult task with great energy and sagacity, but after sev. years he thought it best to make Flanders into a kingdom, and offered the crown to the Prince of Wales. He was massacred in a popular tumult at Ghent.

Artevelde, Philip van (1340-82), son of the preceding, was chosen captain of people of Ghent in a revolt against Count Louis II. in 1382. Defeated Louis, took the city of Bruges, and assumed the state of sovereign. Louis, after having obtained assistance from France, entered Flanders with a Fr. army led by the brave Constable de Clisson. He defeated the Flemings at the battle of Roosbeke and slew their leader.

Arth, vil. of Schwyz, Switzerland, at the S. end of the lake of Zug, 17 m. E. of Lucerne. It is a terminus of the Rigi railway, and stands on the site of the Goldau landslip of 1806. Pop. 5000.

Arthrectomy (Gk. *ἀρθρον*, a joint, *ἐκτομή*, a cutting out), excision of a joint.

Arthritis, inflammation of a joint, usually due to gout or rheumatism. Rheumatic gout, or *A. deformans*, however, has probably no close connection with either gout or rheumatism. It is a chronic disease, involving changes in the cartilages, synovial membranes, etc., and generally producing great deformity in the joints. The actual cause of the disease is still a matter of doubt, but there is an increasing disposition to regard it as being of microbic origin. One joint, usually of the hand, is first affected, and then the corresponding joint on the other side. All the joints of the feet, arms, legs, and trunk may be symmetrically invaded in turn in bad cases. The course of the disease is extremely variable; it may gradually lead to total helplessness, but occasionally improvement may be expected. Although looked upon as incurable, *A. deformans* is not immediately dangerous to life.

Arthropoda (Gk. *ἄρθρον*, joint, *πούς*, foot), a zoological term applied to a group of animals with jointed limbs,



including insects, spiders, and crustaceans. They are segmented animals, often bearing appendages on the segments, are bilaterally symmetrical, covered with a firm cuticle; they have foot-jaws, and the brain is connected with ganglia to the food canal. The name has been used somewhat variously in different systems of classification, but Sir E. It. Lankester restricted it to one section of the div. *Appendiculata*, or segmented animals with a pair of lateral appendages to each ring. The *Appendiculata* are divided into the minute animals *Rotifera*: the *Chaetopoda*, or worms; and the *A.*, where the lateral segments have become specialised into jointed limbs, claws, and jaws. The *A.* were divided by Lankester into *Hyparthropoda*, a hypothetical group to connect the ancestral forms of *A.* and *Chaetopoda*; the *Protarthropoda*, including the genus *Peripatus*, found in Africa, Asia, and Australia; and the *Euarthropoda*, which include the classes *Diplopoda*, or millipedes; *Arachnida*, or spiders; *Crustacea*, as crabs, lobsters, shrimps, etc.; *Chilopoda*, or centipedes, and the *Hexapoda*, or insects.

Arthur, usually described as a hero of mythological romance, but even if the exact historic existence of *A.* cannot be proved, at least some of the deeds ascribed to him can be traced to historical personages. The great authority for the authenticity of a historic *A.* is Nennius, but, as has been pointed out, Nennius lived at least 150 years after the deeds he describes, and no mention of *A.* can be found in contemporary writers. The historic battle of Mons Badon, as great a battle from the point of view of the Britons as the battle of Deorham is from the point of view of the Saxons, can at any rate be ascribed to Ambrosius Aurelianus. This battle is described by Gildas as taking place, as far as we can gather from his data, about the year 516. This great battle, which beat back the W. Saxons and prevented their further advance, is ascribed by Nennius to *A.* Since Gildas, who was a contemporary, whereas Nennius was not, since also Gildas gives the name of all important Brit. chieftains and omits that of *A.*, we can safely conclude that *A.* was not a personage known to Gildas. On the other hand, Nennius gives the names of 12 great battles which *A.* fought, finishing up with the battle at Mons Badon. At this latter battle 960 men are given as having fallen to *A.*'s sword alone. In judging the authenticity of a historic *A.* we must bear in mind that *A.* is a fairly universal personage, but that all nations with which his name is closely identified are those of Brythonic origin. His name occurs in Gaelic history, in Welsh poetry, but of a very much later date than that to which the battle of Mons Badon belongs. Nennius definitely gives us the places where these 12 battles were fought, but archaeologists still dispute the probable sites of these battles. The sites of some of them can be quite easily identified, as e.g. the ninth 'in Urbe Legionis,' i.e. Chester, and the

twelfth at Mons Badon. In the eighth, which was fought 'in Casbello Guinnon,' we are told that *A.* carried an image of the Blessed Virgin on his shoulders, and the heathen were put to flight on that day, and great slaughter made of them through the merits of Our Lord Jesus Christ and through the merits of the Blessed Virgin His mother.' Whatever truth there is, however, in the story of *A.* must be ascribed either to the details given by Nennius or to the data given by Gildas, since much that has been written of *A.* is obviously the invention of a later day, and the *A.* of Geoffrey of Monmouth is almost as impossible historically as is the creation of the mind of Tennyson. The romance of *A.* developed on the lines of medieval chivalry, and the *A.* of the tournaments cannot be compared with an *A.* fighting at Mons Badon, or, as one record describes him, beating back the armoured bands of the Romans on the Rom. walls. It remains now simply to trace the *A.* as we know him in his development by the romantic writers of later centuries. From the Ambrosius of Gildas to the Artorius of Nennius is a long step, and one in which the character and exploits of *A.* have not suffered. But from Nennius to William of Malmesbury is a still longer step, and a step during which the character and exploits of *A.* are developed still more fully and become more and more painted in the light of a contemporary monarch. The *A.* of Gildas, if not also the *A.* of Nennius, must have been simply a Romanised Briton, who led his countrymen against the attacks of a common foe. But later the hand of romance is laid, and not lightly, upon the character of *A.*, and he becomes the centre of a picture of the ideals of chivalry and romance, the perfect knight, the perfect king, the perfect lover. We find the foundations of all Arthurian legend in Geoffrey of Monmouth and later developments in the stories of Sir Thomas Malory and Lord Tennyson. In later romance he has become the beau ideal of the true Christian knight—the knight who, accoutred in the armour of medievalism, goes forth to conquer wrong and free the oppressed. It has already been noted that the stories of our Prince *A.* are universal; the best-known story of how *A.* will come again is told by the Ger. peasantry as how Frederick Barbarossa will come again. The only conclusion that we can draw from so much contradictory evidence is that there may be a historical *A.* but he is certainly not the hero of romance that later ages have made him out to be. In the summer of 1930 an international conference (the first on record) of those interested in the Arthurian legends was held in Cornwall, a spot near the fabled Lyonesse of *A. Le Morte d'Arthur* (Malory); *Poems* (containing the *Idylls of the King*) (Tennyson); and *Two Morte d'Arthur Romances*, are included in Everyman's Library. See also J. D. Bruce, *The Evolution of Arthurian Romance* (Göttingen and Baltimore, 1923-24).

Arthur, Chester Alan (1830-86), the

twenty-first president of the U.S.A., b. at Fairfield, Vermont. He graduated from Union College in 1848; practised law in New York from 1853. Noted for his eloquence in behalf of the coloured people. At the time of the Civil war he was inspector-general and quartermaster-general for the state of New York. He was a Republican and held the office of collector of the port of New York (1871-78). In 1880 he was elected vice-president, and in 1881 became president on Garfield's assassination, but was defeated by James G. Blaine in his candidature in 1884. His administration was marked by measures affecting the tariff, polygamy in Utah, the Chinese, the Navy, and civil service reform. See *UNITED STATES—History*, and Smalley, *Life of C. A. Arthur*, 1880.

**Arthur, Duke or Count of Brittany** (1187-1203), for whose death King John was responsible, was son and heir of Geoffrey, third son of Henry II. In order to destroy his right of succession, King John had him murdered in 1203.

**Arthur, Sir George**, first baronet (1784-1854), lieutenant-general, youngest son of John A. of Norley House, Plymouth. Saw active service in Sicily and in the Walcheren expedition. In 1837 he was made lieutenant-governor of Upper Canada. In 1842 made governor of Bombay presidency.

**Arthur, Sir George**, third baronet (1860-1946), Eng. biographer and soldier, son of the second baronet, Col. Sir Frederick Leopold A.; educated at Eton and Christ Church, Oxford. Given a commission in the Life Guards, 1880. Took part in the battle of Tel-el-Kebir; served in the Nile Expedition, 1884-85. Pub. the first vol. of *The Story of the Household Cavalry*, 1909. In 1914 he was appointed private secretary to Lord Kitchener at the War Office and served in that capacity till Kitchener's death. In 1920 appeared his *Life of Lord Kitchener of Khartoum* (3 vols.), the standard biography. Ed. the letters of Lord and Lady Wolseley, pub. 1922. His *Sarah Bernhardt* appeared in 1923, and his *Life of Lord Wolseley* (in collaboration with Sir Frederick Maurice) in 1924. His second and third vols. of *Household Cavalry* (in collaboration with Capt. Shennan) were pub. 1926. In 1928 he pub. a short biography of *Field Marshal Earl Haig*. A translation of Raymond Poincaré's memoirs (1916) was pub. in 1930. Among his shorter biographies are those of *General Sir John Maxwell* (1932), *Queen Alexandra* (1934), *Queen Mary* (1935), and *King George V.* (1937). Other works: *Not Worth Reading* (an autobiography), 1938; *Wellington to Wavell* (1942), an account of the fortunes of the Brit. Army in the past century; *Concerning Winston Spencer Churchill* (1941), and *Concerning Queen Victoria and Her Son* (1943).

**Arthur, Timothy Shay** (1809-85), Amer. author of moral and domestic tales, especially *Ten Nights in a Bar Room*, which had a great contemporary reputation. He founded *Arthur's Home Magazine* in 1852.

**Arthur's Seat**, a hill roughly in the form of a lion E. of Edinburgh. It is about 822 ft. high, and a fine panorama can be seen from the top. The ascent is easy.

**Artichoke**. Both the true A. (*Cynara scolymus*) and Jerusalem A. (*Helianthus tuberosus*) are species of the Compositæ. The former grows in S. Europe, and its young flowers are edible; the latter, common in Europe and America, has tubers like those of the potato which are also a food.



ARTICHOKE

**Article, Indefinite**, see A.

The definite A. 'the' is allied to the Ger. *der* and the Dutch *de*. In Lat. the definite and indefinite *As* do not exist.

**Articles, The Six**, popularly called 'the six-stringed whip', is the name given to a statute passed in 1539 at the instance of Henry VIII., who was alarmed at the reforming zeal of the Eng. Protestants. These A. asserted the position of the Eng. Church on 6 fundamental doctrines, and were as follows: (1) belief in transubstantiation; (2) communion in both kinds not necessary; (3) celibacy for the priesthood; (4) chastity to be observed when vowed; (5) private mass permitted; and (6) auricular confession necessary. Archbishop Crammer strongly opposed the Act when it was passing through the House of Lords, but the king overbore all opposition. The penalties for contravention of these A. were very severe, and a failure to believe in transubstantiation was punishable by burning alive. Death was also the penalty for a second offence against the other A. This severity was somewhat mitigated by an amending Act in 1544, and the A. were repealed in 1547, after Edward VI. came to the throne.

**Articles, The Thirty-Nine**, see THIRTY-NINE ARTICLES.

**Articles of Association**, the printed list of rules for the conduct of a joint-stock company. See under **COMPANY AND COMPANY LAW**.

**Articles of War** were formerly ordinances issued by the king, or by the

commander-in-chief with the king's authority, governing the conduct of a military campaign and ceasing on its conclusion. Until the passing of the first Mutiny Act (*q.v.*) in 1789 these were the only ordinances regulating the governance of troops, and in times of peace acts such as desertion or disobedience were only liable to the civil law, that is to say, they were merely breaches of contract. The issuing of A. of W. was a prerogative of the Crown which was not taken away by the first Mutiny Act, but in 1803 it was superseded by statutory power to be found now in section 69 of the Army Act, 1881. This power to issue A. of W. is not now likely to be used, for the annually renewed Army Act or Mutiny Act covers the whole ground. Similar in every respect to those of the Army are the naval A. of W., and like them are now embodied in a statute, the Naval Discipline Act. Special A. apply to the native troops in India.

**Articulata** (Lat. *articulare*, to join), an obsolete term applied by Cuvier to segmented animals, as the Crustacea, Myriapoda, Insecta, and Arachnida, now placed under the div. Arthropoda. He included the Annelida, which are not arthropods, and grouped the myriapods with insects.

**Articulation.** In the production of any sound, the tongue is adjusted with relation to the palate at the place called 'place of A.' This is where the tongue has for that sound the maximum elevation. The common use of A. and this technical use are very often used too indiscriminately even by phoneticians.

In anatomy an A. is a junction, or joint, between the bones in the skeleton of a vertebrate animal. Such a joint may be immovable, when the bones are directly united (synarthrosis); or slightly movable, when they are connected by an intervening substance (amphiarthrosis or symphysis); or more or less freely movable, when the articular surfaces are covered with smooth cartilage and surrounded by a fibrous capsule, lined with membrane, secreting a lubricating fluid called synovia (diarthrosis).

**Articulator**, a telephone contrivance to produce smoothness of tone; also a mounter of bones for medical study.

**Artificer Engineers**, a warrant rank in the Brit. Navy, open to engine-room As. of not less than 8 years' service and over 35 years of age. A. E. are on a level with carpenters, and wear the same uniform, with a distinctive stripe of purple cloth on the cuff.

**Artificers, Engine-room**, a rank of petty officers in the Brit. Navy. Candidates for this position must be not less than 21 nor more than 28, and have had some experience in either copper-smith's work, engine-fitting, boiler-making, or general smith's work. There are 4 classes of E. A., the first, or highest, being reached after 12 years' service. A fifth class consists of boys over 15 in training.

**Artificial Flowers**, see FLOWER.

**Artificial Horizon**, see HORIZON.

**Artificial Limb**, a mechanical contri-

vance attached to the stump of an amputated limb and designed to perform the functions as far as possible of the natural limb. An early example, exhibited in the London Royal College of Surgeons, is said to have been made c. 300 B.C. It is an A. leg, made with pieces of thin bronze fastened to a wooden core; the foot, which has vanished, was probably made of wood. Another A. L. of historical interest is the hand of 'Götz of the Iron Hand,' with which he was able to grasp sword and spear.

The great improvement in methods of amputation in recent years has occasioned a corresponding improvement in designs for A. Ls. The surgeon aims at leaving a stump which will preserve the greatest possible length of limb, and which will bear the pressure consequent upon the use of an A. substitute. In the arm the pressure of the appliance is greatest at right angles to the bone, so that the need for a considerable amount of padding over the end of the bone is not so great as in the case of the leg. The 'modified circular' method of amputation, which leaves the cicatrix over the end of the bone, is therefore suitable, as it can be carried out comparatively close to the injured or diseased part. Disarticulation at the wrist-joint leaves a widened stump which is especially suitable for an A. attachment. Amputation through the forearm, if it does not result in the fusion of the ends of the radius and ulna, leaves the power of pronation and supination, that is, of making the movements turning the palm upwards and downwards. Amputation through the upper arm naturally leaves a stiff-arm movement from the shoulder. A hand has been devised by which a certain amount of voluntary and variable movement is imparted to the thumb by means of hydraulic power controlled by an india-rubber ball placed under the arm-pit.

The old method of screwing a hook into the stump of the arm has now been discarded for a spring or snap catch. The Mackay arm is a well-known modern pattern, and is made for high amputation at the shoulder and for amputation at the elbow; the hand is of rubber or wood and the remainder in light perforated metal. Since the First World War, progress has been made in A. Ls., and to-day, with the assistance of harness (usually made of webbing), it is possible for some people to accomplish with their A. Ls. almost as much as they could with their natural limbs. This advance is particularly noticeable in connection with A. hands, for which a mechanism has been invented for grasping and releasing objects by control from the shoulder. Similar progress has also been made in an A. L. for the leg. An essential contributory factor to the success of an A. L. is the determination of the patient to overcome his disability.

A. attachments to the lower limbs also depend upon the extent to which the functions of the limb are impaired. Amputation of a part of the foot leaves the ankle action unrestricted, and the

skin incisions are so arranged that there is no cicatrix or skin-grafting in the part walked upon. It may be generally said that the availability for A. attachments to the lower limb is best served by a 'flap' method of amputation, as the weight must be borne on the end of the bone, and such methods not only provide a sufficient 'cushion,' but can be arranged so that the cicatrix may not come in the line of greatest pressure. It was formerly the custom in amputating the lower leg to sever the tibia just below the knee, so

Saving Society and by the St. John Ambulance Association is called the 'prone pressure' or Schäfer method, and is described in the former body's handbook of instructions thus:

'The apparently drowned person must be placed at once, face downwards, on the nearest flat surface. Place yourself on one side of the patient, facing the head, in a full kneeling position, with knees and hip bent. Put your hands on the small of the patient's back, the wrists nearly touching, the thumbs as near each



*Barbara Wagstaff*

#### TWO METHODS OF ARTIFICIAL RESPIRATION

*Left, Schäfer; right, Sylvester.*

that the A. leg received the bent knee, the stump pointing backwards. The adoption of numerous devices in which the natural action of the ankle is imitated has now led to the preservation of as much of the natural limb as possible, because the extent of curtailment of a limb determines not only the extent of functional loss, but also the amount of leverage available; and consequently the amount of effort required to use an A. L.

**Artificial Respiration,** the mechanical restoration of the act of breathing when it has been suspended by asphyxiation, drowning, poisoning, etc. The natural movements should be imitated as far as possible, and should be performed rhythmically 12 or more times per min. The method practised by the Royal Life-

other as possible without strain and the fingers passing over the loins on either side, but not spread out. Then, bending the body from the knees and somewhat straightening the hip-joints, swing slowly forward, keeping the arms quite straight and rigid, so that the weight of your body is conveyed to your hands. No exertion is required; the necessary pressure is imparted by the weight of your body. In this way the patient's abdomen is pressed against the ground; the abdominal organs are forced against the diaphragm; the diaphragm rises and air is driven out of the lungs, together with any water or mucus which may be present in the air passages and mouth, thus producing expiration.

Next, swing the body slowly backwards to its first position, thus removing its

weight from the hands (which are kept in position) and relaxing the pressure on the abdomen. The organs now resume their former position, the diaphragm descends, the thorax is enlarged and air passes into the lungs, inspiration being produced. Repeat the movements regularly about 12 times a min., swinging the body alternately forwards and backwards from the knees.

Two other common methods are those of Sylvester and Marshall Hall. In the former, the body of the patient is placed upon the back, the shoulders being slightly raised. The operator grasps the arms just above the elbows, and by raising them gently and steadily to their full extent behind the head, induces inspiration. After 2 or 3 secs. they are lowered to the side of the chest and pressed against it, thus causing expiration. The movements, which should be supplemented by friction and preceded by an inversion of the body to drain off water, are often successful even after more than an hr.'s apparently unsuccessful work. In the Marshall Hall method the body is placed on the back with the left arm bent under the head. It is then gently rolled over on to the face, the tongue being held forward, and then back again, so that the thorax is compressed and the lungs are emptied by means of the weight of the body. This should be done every 4 secs. Various other systems are in vogue, and are of advantage in certain cases. *See also* RESUSCITATION and DROWNING.

**Artificial Silk, or Rayon**, as it is now widely called, is prepared by various processes of treating cellulose in solution so as to draw it out into fine threads. Cellulose, which is the basis of all vegetable structure, is for purposes of A. S. obtained usually from cotton or from the wood pulp of spruce trees. As far back as 1754, Réaumur, the Fr. physicist, guessed at the possibility of imitating the product of the silkworm, but it was not until the discovery of nitro-cellulose that A. S. could be produced on an industrial scale. In 1855 Audemars of Lausanne obtained from a solution of nitro-cellulose a thread which he called A. S. and used as a filament for electric globes. From this experiment was derived the nitro-cellulose process, developed by Count Hilaire de Chardonnet in 1886, the first of the 4 different methods by which A. S. is prepared in industry to-day.

**Chardonnet Silk.**—The raw material is washed cotton. From this, nitro-cellulose (gun-cotton) is made, and then dissolved in equal parts of ether and alcohol. The viscous solution, called collodion, is forced through capillary tubes into water. The product is then dried and denitrated by treatment with an alkaline hydro-sulphide.

**Despeissis Silk.**—This A. S., named after M. Despeissis, who invented the cuprammonium process, has the same lustre and elasticity as Chardonnet silk. It is made by dissolving pure cotton cellulose in ammoniacal copper oxide. The dissolved cotton is then filtered and

passed through to the spinnerets or capillary tubes. The resulting threads are coagulated either in acids or alkalis.

**Viscose Silk.**—The cellulose is obtained mostly from wood pulp and treated with caustic soda to form an alkali-cellulose. This is then united with carbon bisulphide to form a xanthate, termed viscose by its inventors, Messrs. Cross and Bevan (1892). After careful filtration the xanthate is conveyed to the thread-forming machines and coagulated by heat.

**Acetate Silk, or celanese**, as it is called, from the product manufactured by the British Celanese, Ltd., is obtained from cotton or wood pulp treated with acetic anhydride. The cellulose acetate, thus formed, is dried and then dissolved in acetone. After filtration, the mixture is ready to be made either into 'dopes' and varnishes, such as are used for aeroplane fabrics, or into silk threads. Celanese is softer than other artificial silks, and is least affected by water. This makes it suitable for fishing lines, etc. It is also used by electricians as an insulator. *See* E. Wheeler, *The Manufacture of Artificial Silk*, 1921.

**Artigas, Fernando José** (c. 1755–1851), S. Amer. soldier and politician, b. at Montevideo; became captain of a corps in the Sp. provincial service, but left this in 1811 for the Revolutionary army. Later he joined the Republican army, but was outlawed by the commander Sarratea, for independent action. He then organised a troop of gauchos, and was so successful that he was recognised as an independent chief and given the whole of Uruguay in 1814. He expelled the Portuguese from Montevideo and became dictator, but was ultimately defeated, and in 1820 fled to Paraguay, from where he was sent into exile in Candelaria.

**Artillery** (from O.Fr. *artillerie*; It. *artiglieria*; Sp. *artillería*). Its former meaning comprised all implements of war, and was generally used in the plural. Then the word was used particularly to denote engines for discharging missiles, as catapults, bows, crossbows, and slings. In modern use the word denotes: (1) all firearms discharged from carriages in contradistinction to small arms; (2) the particular troops engaged in the service of such firearms; (3) the science which treats of the use and management of ordnance.

**Early Hist.**—In the O.T. 'engines invented by cunning men to shoot arrows and great stones' are mentioned. Continual improvements were made, and under the names catapult, ballista, trebuchet, such arms were used in medieval warfare. A small piece of cannon was contrived by Schwartz, a Ger. Cordelier, soon after the invention of gunpowder in 1330. But even on the discovery of gunpowder these weapons were not readily displaced. The first occasion on which guns were used was probably at the siege of Cividade in Italy, when the Gers. employed one piece. It is also said that the Moors of Algeiras used A. in Spain in 1343. According to some historians, guns were used at Crécy

in 1346, when Edward III. used 4 pieces of cannon. The Eng. also used A. at the siege of Calais in 1347. The Venetians employed A. against the Genoese in 1377. At the siege of Harfleur (1415), 25 'master gunners' and 50 'servitour gunners' were employed. A gunner of that time had charge of all guns and stores, and laid and fired the cannon in action.

*Beginnings of Field A.*—In the early stages of its hist. A. was chiefly used as a battering-ram, and did not come into general use until late in the fifteenth century. The *Wagenburg*, denoting a cart armed with guns, came into prominence in the Hussite wars of 1419-24. Small guns were used in 1460 to clear the streets during fighting in London, and heavy ordnance to batter the walls. The greatest example of A. work in the fifteenth century was the siege of Constantinople in 1453, when the Turks used a large force of A. Sev. pieces used at the siege survived until the eighteenth century. These pieces were chiefly used for siege purposes and were highly effective. Many of the barons' castles were destroyed, and a prince who possessed such pieces had no difficulty in overcoming an adversary whose force lacked A.

*Middle Ages.*—In the wars waged by Charles VIII., Louis XII., and Francis I. of France, in Italy, A. played a most conspicuous part in siege and field warfare; e.g. at Ravenna (1512) and Marignan (1515) great execution was made. Nevertheless when the arquebus and other small arms became efficient very little was heard of the field A. The efficiency of the Eng. archers prevented opportunities for developing the arm in England. During Henry VIII.'s reign culverins were used as heavy pieces, and sakers and falcons as lighter pieces. A great Turkish gun carrying 6000-lb. shot was used at the siege of Constantinople.

During the Eng. Civil war guns were in use. Cromwell in his sieges made great use of shells. Before his changes in the position of the A. the pieces were placed in the front of the force. He relegated the heavy pieces to the rear.

*Eighteenth and Nineteenth Centuries.*—Cromwell's policy was followed in the campaigns of Louis XIV. In the days of Turenne heavy guns were much employed. Marlborough also had about 9 pieces per 1000 men, and as he had an army of about 11,000 he used about 99 guns. The pike disappeared about 1700, and then infantry fire power became the decisive factor in battles. The Royal Regiment of Artillery was founded in 1717. In the year 1793 the Eng. force of A. had increased to 4000. For 5 centuries the word A. was strictly limited to mean garrison A. The field A. existed only in time of war. In 1793 horse A. was introduced, and drivers' corps in the following year. Field brigades of 6 guns were then formed, horse A. batteries being styled troops. A troop of horse A. and a field brigade each had 5 guns and 1 howitzer. The

driver corps of 1794 was divided into troops. The addition of one of these to a company of foot A. converted the latter into a field brigade.

*Fr. Revolution and Napoleon.*—During the wars of the Fr. Revolution the A. of the field army received the name of the field A. The field guns were organised into batteries, each complete in itself. The Fr. A. steadily improved in manœuvring power during the Fr. wars. Napoleon himself maintained that the man who was clever enough to bring up an unexpected force of A. unknown to the enemy was sure to win the day.

After 1815 the hist. of A. becomes merely a matter of perfecting a material already discovered. Infantry fire being more variable in its effectiveness, the period 1815-70 saw many changes in the relations of the 2 arms. The introduction of the rifled musket demolished the A. manœuvres of the smooth-bore days. Up to this time A. forces depended very much on case-shot firing or firing their guns at close quarters. On the introduction of the new musket, infantry armed with a far-ranging rifle could keep the guns beyond case-shot firing and compel them to use only round shot or common shell. In the Amer. Civil war, the attacking infantry on reaching close quarters met the full force of the defenders' artillery together with the full force of the musketry. Battles began to be fought at increased ranges and the ineffectiveness of the projectiles used by the A. neutralised the effect of rifled guns. After the Franco-Ger. war many lessons were learnt and many changes were made in the use of A. New ideas on A. spread rapidly, and the quick-firing gun was soon introduced into every army. The original designs have been greatly improved upon, but the prin. still remains. These are, in brief, the mechanical absorption of the recoil by means of buffers, and the development of time shrapnels as projectiles of the field A. Then attention was turned to the increase in rate of fire. A shield was then attached to the gun for the protection of the detachment. One result of the Boer war was to re-introduce heavy ordnance into field armies. Field howitzers also reappeared. At the latter part of the nineteenth century siege and fortress A. also underwent many great changes and developments. During the Franco-Ger. war of 1870-1871 rifled guns 'long and short' for direct and curved fire were used as siege A. At present howitzers are the prin. siege guns.

*Organisation, Brit. Field A.*—A battery of field A. comprises 3 constituents, viz. (1) *material*—guns, carriages, ammunition, and stores; (2) *personnel*—officers, non-commissioned officers, gunners, drivers, and artificers; and (3) *transport*—horses and other animals, motor and other means of transport. The usual number of guns in a battery is 6. Formerly 'mixed' batteries of guns and howitzers were in use. Machine guns are not included under the

title of A. weapons. The vehicles of a battery include ammunition wagons, stores and provision wagons, and forage wagons. Various opinions have been expressed on the amount of ammunition required with a field battery. The larger the amount carried the more independent will be the battery, although it encumbers the battery with more vehicles. Some guns have 3 or 4 wagons of ammunition attached. The battery is generally commanded by a major, with a captain as second in command. The battery is divided into sections of 2 guns each, each under a subaltern officer, who is entirely responsible for everything in his section. These sections are again subdivided into subsections, each consisting of 1 gun and 1 wagon, men, and stores. These subsections are each under the command of No. 1, a sergeant, who is responsible for his subsection to the section commander. 'No. 1' rides with the gun. Another non-commissioned officer rides with the first wagon, and gunners sit on the gun-carriage, wagon, and limbers. The battery also includes baggage wagons, trained signallers, and range-finders.

*Horse A.* differs from field A. in that the whole detachment is mounted, leaving guns and wagons free from the load of men. With int. A. the whole equipment is carried on the backs of mules and other animals. For action the loads are lifted off and assembled.

*Higher Organisation of A.*—In most countries (with the exception of Great Britain) are regiments and brigades of 2 or more regiments. In Great Britain the Royal Regiment of A. still comprises the whole personnel of the arm of the former Royal Horse A., Royal Field, and Royal Garrison A. To each are added the Special Reserve and Territorial A. In Great Britain the administrative and tactical unit is the brigade. Provision is also made for control of *matériel*. The unit mentioned above consists, in case of guns, of 3 batteries (18 guns); in the case of howitzers, of 2 batteries (12 howitzers); and in the Horse A. of 2 batteries (12 guns), and is commanded by a lieutenant-colonel.

*National Volunteer Artillery Association* held its first meeting for shooting for prizes, given by the queen and others, at Shoeburyness, July 1865. Meetings were held and prizes distributed in 1866, but no meetings were held during the S. African war nor during the two World Wars.

*Royal Artillery Institution*, estab. at Woolwich, proposed by Lts. Eardley-Wilmot and J. F. Leffroy in 1838, approved in June of the same year.

The alleged great deficiency of A. in the Brit. Army was much discussed in 1870. At the A. camp at Aldershot the efficiency was reported to be very fine. In 1877 a new organisation of A. was proposed. Great improvement was made in field guns, and impulse given to the subject by the war in S. Africa, 1899-1903. In 1903 the gun committee adopted a new type of field gun, a 15-pounder quick-

firer with effective shrapnel range of 6500 yds. and further range of 1000 yds. It was, however, to be learned by bitter experience in the opening months of the First World War, how inadequate Brit. 4-in. field guns were for modern warfare. (Consult the dispatches of Gen. (later F.M. Earl Ypres) Sir John French, 1914.)

*Development in the First World War.*—Four years of scientific warfare in the First World War saw a consistent and progressive development in the power and influence of A., both in the actual fighting battle and in all the stages which lead up to it. Despite the handicap under which Great Britain started the war, Brit. A. played a large part in that development, and in the later years dominated the enemy's A. to an ever-increasing degree, and the influence of that fact upon the morale both of the Brit. and of the enemy's troops could scarcely be exaggerated. (See F.M. Haig's dispatch, Dec. 21, 1918.)

Ever-increasing demands for guns were made in the first 2 years of the war. These could not be met at once. Existing machinery had to be adapted to enable technical improvements in A. to be effected. Firing tests and travelling trials had then to be carried out before new guns were ready. The hist. of the war proved that improvised A. material was never satisfactory. The only modern heavy howitzer available to the Brit. Army in 1914 was the 9.2 in. Mark I. howitzer, a weapon designed and constructed under the guidance of Maj.-Gen. Sir Stanley von Donop. When in 1916 Gen. Haig was calling for ever more guns, he selected the latest 'Marks' of existing models in order to facilitate construction and ensure uniformity in design. At the same time, the commander-in-chief insisted that every effort should be made to increase the range and accuracy of guns and that there should be no cessation of research and no finality of design.

The 2 main principles on which the construction programme was based were to give a decisive fighting superiority per dir. over the Ger. A., and to use heavy guns only for work that heavy howitzers could not do. The preference for the howitzer over the gun was justified. Its 'life' is greater, e.g. for a 6-in. gun, Mark VII., the 'life' is 1500 rounds, for a 6-in. howitzer, 10,000 rounds. The howitzer, too, is much easier to place in position in the field, and many can be sited in a comparatively restricted area, owing to the higher line of departure of the shell. Though they have less range than guns of a similar shell-power, howitzers are more mobile and, fired at horizontal ranges, their accuracy is greater.

The continuous A. battle which began on the Somme in 1918 and ended in the smothering of the Ger. guns would have been impossible if the proportion of medium and heavy howitzers to heavy guns had not been large—nearly 70 per cent to 30. In 1914 there were in the

original Brit. Expeditionary Force 486 guns and howitzers, 24 of which were of medium calibre; at the armistice there were 6437 guns and howitzers of all kinds (excluding anti-aircraft A., and trench mortars), of which 2211 were medium and heavy A. To accomplish the twofold purpose of destroying the enemy and protecting its own armies, under such conditions as obtained on the W. Front, A. batteries must cover the infantry in attack by 'barrage' fire; dominate the enemy's A., by unrelenting counter-battery work; and delay and hamper the enemy's movements in rear by harassing day and night fire on his roads. The Ger. A. comprised only a few howitzers of 16½ in. calibre. The Fr. field gun was the famous 75-mm. quick-firing gun, with the recoil controlled by compressed air. It was used with deadly results in the defence of Verdun and indeed played almost the dominating role in the first two years of the war.

In France, after the battle of Ypres, 1914, the Gers. held all the high ground N. of the allied front. The power of observation therefore lay with the Ger. A., and the Brit. gunner, but for the help of airmen and the survey sections, who supplied specially mounted maps, would have shot 'blind.' Science played its part in ensuring the correct height of burst of the shrapnel shell. The barometer and thermometer were a valuable part of A. stores, and for night-firing, electric lights were supplied for the aiming posts to make certain of the gun being on the correct line. Accuracy of fire was further secured to the field A. by the establishment of calibration sections; i.e. by firing through screens the exact initial velocity of every gun could be estimated. The result of this scientific progress was that in the Cambrai battle (q.v.) (1917) registration was dispensed with, so that surprise was possible. This element of surprise reached its acme in the battle of Amiens (1918) when over 2000 Brit. guns opened fire from their attack positions for the first time on the actual morning of assault. Counter-battery work became an exact science through the progress made in aerial photography and observation, sound-ranging, flash-spotting and air-burst ranging. Every Brit. gunner officer in France was a reconnaissance officer, whose duty was to keep track of each enemy gun and to have photographed the slightest alteration in the terrain on his front. The later technical improvements in A. design included long-range, modern 6-in., 8-in., 9.2-in., and 12-in. howitzers, 6-in. Mark XIX. guns on field carriages and 9.2-in. Mark XIII., 12-in. and 14-in. guns on railway mountings. Other improvements were instantaneous fuses, gas and smoke shells, stream-line shells, incendiary and star shells. A proposal after the war was that all A. weapons must be able to put up an air barrage against attacking aeroplanes, and hence construction must allow for a very high angle of elevation. (Gen. Sir Noel Birch,

K.C.M.G., in the *Army Quarterly*, Oct. 1920.)

**Second World War Developments.**—The Second World War saw a great development of anti-aircraft and tank guns. Also various types of self-propelled guns were used for assault or close support. One type was a 75-mm. mounted on a light tank chassis, and another a 150-mm. on a medium tank chassis. The advantage of these was that A. accompanied tanks and could fire straight away. The type was first used in the big battle for Libya (1941-42).

The improved Ger. 88-mm. gun was probably the best 3-purpose gun (i.e. anti-tank, anti-aircraft, and field artillery piece) developed during the war. Many new types of A., including very huge mortars and long-range field guns, were under development or construction in Germany in the closing stages of the war. Some of them had rocket-assisted shells. Among these were a 380-mm. howitzer and rocket 'guns' with smooth-bore barrels, 400 ft. long, intended for the bombardment of London. A new 120-mm. anti-tank gun was likewise in development. The Gers. were also working on a 32-in. siege gun, with a barrel 141 ft. long, which fired an 8½-ton projectile. In the last months of the war in the Far E., the Jap. also introduced some heavy mortars and heavy rockets. Amer. recoil-less guns were also a notable development.

**Artiodactyla** (Gk. *ἄρτιος*, pair, *δάκτυλος*, finger), a sub-order of placental mammals forming part of the order Ungulata. The Ungulata are characterised by a hoof-like covering to the toes, and molar teeth with broad crowns suitable for crushing vegetable food. The sub-order A. are distinguished by possessing pairs of symmetrically arranged toes, giving the characteristic appearance of a cloven hoof. The sub-order comprises the following groups: (1) *Pecora*, including giraffe, okapi, deer, oxen, sheep, goats, antelopes, etc., characterised by horns or antlers, 2 or 4 teats, 4 cavities in the stomach, and no upper incisors; (2) *Tylopoda*, including camels and llamas, characterised by absence of horns, few teats, 1 pair of upper incisors, and a cushion-like pad on the foot to bear the weight of the body; (3) *Tragulina*, the chevrotians, or mouse-deer, characterised by absence of horns, no upper incisors, 4 complete toes on each foot, and 3 stomach cavities; (4) *Anoplotherina*, comprising extinct species with complete series of teeth and a general resemblance to carnivorous animals; and (5) *Suina*, or pigs, including Old World pigs, Amer. peccaries, and hippopotamus, and characterised by at least 1 pair of upper incisors, the cheek-teeth prominent, a caecum in pigs, but not in the hippopotamus.

**Artisans' Dwellings.** see HOUSING.

**Artists' Rifles**, the 28th Battalion of the London Regiment. Formed in 1859, as a volunteer corps, by Lord Leighton and other artists, and recruited from artists. Full dress (pre-war) grey tunic, with black and silver facings.

**Artocarpus**, a genus of the Moraceæ



which grow in Asia. *A. incisa* is the bread-fruit tree common to the S. Sea Is.; it has a spurious fruit called a *sorosis* (cf. pineapple), which is roasted and eaten as bread. *A. integrifolia*, the Jack tree, has a prickly fruit which is not so wholesome as that of *A. incisa*. *A. hirsuta* makes good timber.

**Artois**, a prov. in the N. of France, conquered by the Franks in the fifth century. It was given as a dowry by Charles the Bold to his daughter Judith. In 1237 it was made a co. by Louis IX. It passed into the hands of Flanders and Burgundy, but was ceded to France in 1659. Louis XV. created his grandson count of A., who became king as Charles X., 1824. A. is famous for its artesian wells.

In the First World War the first heavy fighting in the A. region was in 1915, when the Fr. and Brit. in co-operation delivered a general attack beginning on Sept. 25, a few m. to the N. of Arras, there being simultaneously an attack by Gen. Castelnau in the Champagne between Rheims and Verdun. The opening stages of the A. advance were crowned with success, of a kind which in these earlier years of the war raised illusory hopes of the dawn of ultimate victory. Fr. troops under Gen. d'Urbal took Souchez and the foot of the famous ridge overlooking the little tn. of Vimy, while the forces of Sir John French carried the enemy's first and most powerful line of entrenchments, extending from W. of the mining tn. of Lens to a point near the notorious Hohenzollern redoubt, covering a front of some 4 miles. Much had been hoped from the activity in Brit. munitions factories, and this activity now bore fruit in the storming of an extremely strong position consisting of a double line of field-works punctuated with large redoubts and strengthened with bomb-proof shelters and a maze of well-organised trenches. Loos fell to the Brit., who pressed on to the outskirts of Hulluch near La Bassée. On the reduction of the Ger. second line the dominating position known as Hill 70, beyond and to the N. of Loos, was captured and a position rapidly consolidated whence it was hoped soon to overcome the third and last line of the enemy. Some considerable success had, at the same time, attended the Fr. onslaught in the Champagne; but thereafter the allied attacks fell away. The important strategic objectives in A. were the railway connections at Lens and at Somme-Py in Champagne, but the Allied advance had spent itself, and it soon became clear to the popular mind in England that some much greater effort in the production of material would be required before any further attempt on a big scale could be made with any reasonable hope of success. (See also ARRAS, BATTLE OF; LOOS, BATTLE OF.)

In 1916 the Gers. delivered a local attack on Vimy Ridge in May, but the battle of that name was fought between Apr. 9 and 11, 1917, when gallant Canadian troops were conspicuous in the

attack. In the same year was fought the battle of Hill 70, between Aug. 15 and 25, in the Souchez R. dist. from Lens to Angres. In 1918 there were heavy engagements in the course of the second battles of Arras (Aug. to Oct.) during the successful operations for the breaking of the Hindenburg line. In the final advance, the last fighting in A. was approximately on Oct. 17, when Douai fell to the Allies.

**Artophorion**, the pyx used in the Gk. Church. See Neale, *History of the Holy Eastern Church*, 1850.

**Artôt**, Alexandre Joseph Montagny (1815-45), a Belgian violinist, who was b. at Brussels and d. at Ville d'Avray. When quite a child he showed extraordinary skill, and was taken to Paris, where he was the pupil of Rodolphe Kreutzer. He became a celebrated player, and was also known as a composer.

**Artôt**, Marguerite Joséphine Désirée Montagny (1835-1907), a celebrated Belgian singer. She first sang at concerts at Brussels, and then, on the recommendation of Meyerbeer, she went to Paris, and made her début in *The Prophet*. She afterwards went to Italy and to Berlin, where she took part in Ger. and It. operas. She was married to Padilla, the famous Sp. singer.

**Arts Council**, the successor to the Council for the Encouragement of Music and the Arts, a wartime organisation formed to serve directly the artistic needs of the public at a time when the normal sources of the supply of aesthetic entertainment were disorganised by the war. These exceptional conditions having passed, the aim of the A. C. is chiefly to supplement the ordinary commercial provision of drama, music, and the visual arts and to encourage it by setting a high standard. As regards the arts of painting, sculpture, and the like the chief need is still the exhibition of good examples of various schools. But as regards concerts and plays the policy of the council is rather to support commendable independent ventures than to provide them directly. Thus, opportunities of helping such forms of music as symphony concerts, adversely affected by rising costs, and grand opera have increased and need careful consideration. Again, the importance of assisting the revival of the drama in the provinces is recognised by the council, whether the revival be accomplished through local effort or by means of touring companies. The report of the A. C. for 1946-47 shows that 53 companies produced 419 plays or ballets, and that 92 exhibitions were shown in 335 places. The council received £320,000 from the Treasury, with a supplementary grant of £30,000 for the Covent Garden Opera Trust. During the same year 951 symphony concerts were given by the London Philharmonic, the City of Birmingham, the Hallé, and the Liverpool Philharmonic Orchestras. Among the grants and guarantees given during the year were £55,000 to Covent Garden; £25,878 for symphony orchestras, and £12,000 for industrial music clubs. The cost to the council of companies

engaged for tours was £41,500. The offices of the A. C. are at 9 Belgrave Square, London.

**Arts, Degrees in**, see DEGREES.

**Arts, Fine**, see FINE ARTS.

**Artveldt, Andries van** (1590-1652), a Flemish painter, who worked for sev. years at Genoa. His pictures were mostly landscapes and seascapes. His portrait was painted by Van Dyck.

**Artvin**, a tn. in the vilayet of Coruh, Turkey. Exports fruit, nuts, olives, tobacco, and hides and skins. Pop. 30,000.

**Artz, David Adolf Constant** (1837-90), Dutch *genre* painter. Inspired largely by Jo-ef Israels (*q.v.*). Among his characteristically realist paintings are 'With Grandmother,' 'The Old Fisherman,' 'In the Dunes,' and 'The Return of the Flock.'

**Aru**, a group of is. in the Dutch E. Indies off the S.W. of New Guinea. Total area 3244 sq. m. The is. are low and swampy, and the coasts are fringed with coral reefs. The vegetation is luxuriant. The natives are Papuans of mixed blood, and resemble the Melanesians of New Guinea. The is. are governed by rajahs, and there is (1941) a Dutch representative called a *spolhouder*. There are Christian churches and Mohammedan mosques. The natives barter for tortoise-shell, pearls, pearlshells, and trepang. Pop. about 22,000.

**Aruba Island**, one of the Dutch Antilles, near coast of Venezuela. Area 64 sq. m. Chief tn., Fort Zoutman. Pop. 9349.

**Arum**, a genus of the Araceæ, is a curiously shaped plant which grows in Europe. *A. maculatum* is the cuckoo-pint, or lords and ladies, found in woods and hedges of Britain.

**Arun**, River, rises in St. Leonard's Forest, flows W. and then S. through Sussex, past Arundel to Littlehampton on the coast. It is 40 m. long, and is navigable for a part of its course.

**Arundel**, an ant. municipal bor. of Sussex, on the Arun. The castle was built by Saxons in the year 800. The duke of Norfolk enjoys the earldom of A. as a feudal honour, by inheritance and possession of the castle without any other creation. Ant. seat of Fitzalans and Howards. There is a Rom. Catholic church erected by the duke of Norfolk. Pop. 2500.

**Arundel, Earls of**. The earldom of A. has been held chiefly by the families of Fitzalan and Howard, and their descendants.

**Richard Fitzalan** (1267-1302), earl of A., son of John, lord of A. (1246-72). Richard was called earl of A. c. 1289. He fought for Edward I. in France and Scotland.

**Edmund**, successor of Richard (1285-1326), married Alice, sister of Earl de Warenne; enemy of Piers Gaveston; declined to march with Edward II. to Bannockburn. In 1321 became connected with the Despencers and sided with the king. Executed at Hereford by partisans of Queen Isabella.

**Richard**, son of Edmund (1307-76), soldier and faithful servant of Edward III. Present at Sluys and siege of Tournai, 1340. Led an Eng. div. at Crécy, and was present at the siege of Calais. Inherited estates of his uncle John, Earl de Warenne, and assumed the title of earl of Surrey. Regent of England, 1355.

**Henry Fitzalan**, twelfth earl of A. (1517-80), son of William, eleventh earl of A. Attended King Henry to Calais; made deputy of Calais, 1532. Commanded Eng. expedition to France and took Boulogne. Made lord chamberlain. Imprisoned in Tower in 1551 for being implicated in Somerset's plot against Northumberland. On Edward's death Henry joined Northumberland, though secretly in alliance with Mary. In Northumberland's absence he denounced him and proclaimed Mary as queen. Made privy councillor and lord steward. He was engaged in intrigues to set Lady Jane Grey on the throne, and was arrested on exposure of the Ridolfi plot in Elizabeth's reign.

**Arundel, Thomas** (1353-1414), archbishop of Canterbury, son of earl of A. Made bishop of Ely when he was 22, and lord chancellor 10 years later. Made archbishop of York in 1386, and archbishop of Canterbury, 1396. In the next year he was banished for high treason. He promoted the elevation of Henry IV., and on his succession he was restored to his see. He persecuted the followers of Wycliffe, prohibited translation and reading of the Bible, and helped to procure the statute, *De heretico comburendo*.

**Arundel Marbles**, part of a collection of ant. sculptures purchased by Thomas Howard, earl of A., in 1624. The gem of the collection is the Parian Chronicle, consisting of fragments of a marble inscription supposed to have been executed in the is. of Paros, c. 263 B.C. In its complete state the inscription recounts, in chronological order, the chief events in Grecian hist. from 1582 to 264 B.C.

**Arundo**, a genus of plants of the Gramineæ which grow in Europe, Asia, and Africa. *A. donax* is our largest cultivated grass, which grows to 10 ft. in height; the stems are made into fishing-rods. *A. phragmites*, or *Phragmites communis*, is the common reed.

**Aruspex**, see HART'SPICES.

**Aruwimi**, a trib. of the Congo. It was explored by Stanley for 100 m. in 1883, and by its means Stanley advanced to help Emin Pasha in 1887. It is maintained by some to be the lower course of Schweinfurth's Welle. It has its source near Lake Albert (Nganza) and is formed by many sub-tributaries. The main riv. flows for most of its length through the great equatorial forest, and in its densest part. It joins the Congo in lat. 1° 12' N. and is navigable for nearly 100 miles as far as the Yambuya rapids.

**Arva**, a co. in Czechoslovakia. It is very mountainous and has extensive

forests; and is watered by the White A. and the Black A., which unite and flow into the Wnag. Area about 800 sq. m. Pop. 85,000.

**Arvad**, or **Aradus** (Jezireh Ruad), an anct. Phœnician city. It occupies a very small is., 2 m. from the coast, near the mouth of the R. Eleutherus (Nahrel Kebir). It is said to have been founded by Sidonians. The inhab. were skilled in all matters of seamanship.

**Arval Brethren**, or **Fratres Arvales**, consisted of a college of 12 priests in Rome. They made yearly offerings to the field Lares for increase in the fruits of the field. Romulus is supposed to have been the founder. It has been suggested by Niebuhr that this college was originally connected with the Lat. element of the Rom. state. The sister college was known as **Sodales Tituli**. The badge of office, which was of lifelong duration, was a chaplet of ears of corn worn on the head with a white band. The prin. festival was held for 3 days in May, when honour was paid to Dea Dia. The latter is supposed to be Ceres, and an account of the festival is preserved in an inscription written in the first year of the Emperor Elagabalus, A.D. 218.

**Arve**, a very rapid, mt. stream which rises in the Col de Balme in the mts. of Savoy, flows through the valley of Chamonix, and joins the Rhône near Geneva. Its length is 60 m., and it obtains its waters from the glaciers of the chain of Mont Blanc.

**Arverni**, name of anct. Gaulish tribe in the Auvergne Mts. in France (the name Auvergne derives from A.). The tribe resisted Cæsar longer than other tribes of Gaul. They adopted Rom. civilisation readily after Cæsar's triumph. During excavations a part of the temple of their 'god of the mountain' was unearthed.

**Arvers**, **Alexis Félix** (1806-50), a Fr. poet and dramatic writer. His first work was entitled *mes heures Perdues*, 1833, a collection of poems, which earned for him the reputation of a poet. His dramatic works consisted of *En attendant*, with Bayard and P. Foucher, 1835; *Les Deux Maîtresses*, with Scribe, 1836; *Les Dames patronnesses*, with Scribe, 1837; *Rose et Blanche*, 1837; *La Course au clocher*, 1839; *Le Beau Martial*, 1839; *Les Anglais en voyage*, 1844; and *Suzon et Suzanne*, 1850.

**Arveyron**, a trib. of the Arve in Savoy. It is an outlet of the Mer de Glace in Chamonix valley. It issues thence through a wonderful grotto of ice, known as the Ice gates of A. The course is short and joins the Arve on the r. b.

**Arvicola** (Lat. *arvum*, field, *colere*, to inhabit), or *Microtus*, the generic name of the voles, near relatives of the mice and rats. It belongs to the order Rodentia and family Muridae.

**Arwangwa**, see **PUNGWE**.

**Arya Samaj**, a society, founded by Dayananda Sarasvati (d. 1882), which regards the Vedas as inspired. It became mainly a political body, aiming at the self-gov. of India, and determined to drive out the foreigner. It is con-

nected with the Brahma Samaj, the Society of God, the name given to the most remarkable modern religious revival in India. This society was founded by one Rajaram Mohun Roy, who was b. in 1774. He had studied Hinduism at Benares, and Buddhism in Tibet. At length, c. 1830, he founded the society known as the Brahma Samaj. The ideal of this society was, whilst denouncing sati and idol-worship, to establish an eclectic system of practical morality, and to bring back into favour an ideal Brahmanism, in the worship of a supreme deity, the essence of the universe. The movement was undoubtedly influenced by Christian and Mohammedan thought, but was nevertheless Brahmanical in character. Rajaram Mohun Roy lived and died a Brahman. After his death, in 1842, the movement became known as the Adi Samaj, or New Society. Debendra Nath Tagore followed Rajaram Mohun Roy, and was in turn followed by Keshub Chandra Sen, from 1838 to 1884. The latter completely changed the character of the movement, substituting God the Father for the Vedic deity, and as a consequence alienated many of his adherents. He lost many more by allowing his daughter to marry the maharajah of Kuch Behar when she was only 14 years of age. His followers went over to the Sadharana Brahma Samaj, or General Society of God. Allied to this movement may be mentioned the Prarthana Samaj, or Prayer Society.

**Aryan** (race and language), or **Arian** (from Lat. *Arianus*, belonging to Aria, the E. part of anct. Persia). The name given to the race from which the inhab. of India and Europe have sprung or for the so-called Indo-European races. It was originally given to the Sanskrit-speaking immigrants who came from India, and was also adopted by the anct. Persians. Properly, however, the word has no ethnological significance, but connotes a language group—i.e., an E. branch, comprising the Slavonic, Indian, Armenian, and others, and a W. branch, which includes the Teutonic and Celtic.

It is universally maintained that about three or four thousand years ago there lived a tribe or tribes of the same race, in some part between the Hindu-Kush Mts. and the Caspian Sea, who called themselves **As**. Although no written testaments of these **As**. are in existence, yet the character and habits of these people have been inferred from facts revealed by philological research. Thus experts in the science of language inform us that the **As**. lived in tns., kept cattle, ploughed the ground, used metals, made boats, could count up to a hundred, recognised family relations, and had various names for God. The line of argument adopted by these experts is this: If, they say, we find the same word to express 'sheep,' 'plough,' 'horse' existing under various disguises in a number of different languages, then the tribe from which these races sprung must have had a word to express 'sheep,' 'plough,' 'horse,' and if they had the name, then

they must have been acquainted with the thing. Language helps us again in fixing the original home of the early As. From the A. names for certain plants and animals we infer that the As. had their homes in those dists. where those plants and animals would exist.

Some of the A. languages are more closely connected than others. The more closely allied languages are arranged in classes known as stocks. The stock is further subdivided into classes known as branches. If we take our own language as an example, we shall find that it belongs to the Teutonic stock. Many other languages also belong to this stock, some of which resemble Eng. more closely than others. Dutch, Flemish, Ger., Norwegian, Swedish, Dan. are all Teutonic languages, but they fall into different groups. Eng., Dutch, and Flemish are Low Ger. languages. When the terms Low and High are used with regard to a language, they signify that the people of whom they are used lived on the lowlands near the coast, or on the higher ground of the interior. Modern Ger. is a High Ger. language. Again, the languages of Iceland, Norway, Sweden, and Denmark form a third group called the Scandinavian group. Thus the Teutonic stock is subdivided into 3 branches, viz. Low Ger., High Ger., and Scandinavian. If we were to give Eng. its full designation, we should say that it is a member of the Low Ger. branch of the Teutonic stock of the A. or Indo-European family of languages. Another stock is the Romanic or Italic. Lat., It., Fr., and Sp. belong to this. They are known as Romanic languages, because they come from a Rom. source. Then, again, there is the Hellenic or Grecian stock, which is represented by modern Gk. The Celtic stock has a particular interest for us, because the inhab. of our is. before the arrival of the Saxons were known as Celts. Celtic dialects are spoken now in parts of Great Britain and Ireland. The Celtic stock falls into 2 branches, Cymric and Gaelic. Under the former head are placed the Welsh language and the Armorican, a dialect of Brittany. The old Cornish, which existed until the eighteenth century, also belonged to the same branch. To the Gaelic group belong native Irish or Erse, the Scottish Gaelic of the highlands, and the Manx of the Isle of Man. The language brought to this is. by Eng. forefathers in the fifth and sixth centuries was a pure Teutonic speech, and it continued to remain pure for a long time. The influx of foreign words into our language was slow at first. On the other hand, although modern Eng. is essentially a Teutonic language, it contains a large Italic element, has received considerable additions to its vocabulary from the Hellenic source, and possesses also many Celtic ingredients. Thus 4 different stocks have contributed to its formation.

Two sub-groups of the Balto-Slavonic group complete the European members of the A. family: the Baltic, including

extinct dialects of Old Prussian and Lithuanian and Lettish; the Slavonic, including Russian, etc., Polish and Czech; and Bulgarian, Serbian, and Slovene.

As the name Indo-European implies, some of the languages of Asia belong to this family. These fall into 2 groups. One group is the Indian, which includes Sanskrit, a dead language having important literature; the modern dialects of India which came from Sanskrit, such as Hindustani and Bengali; and Sinhalese, the dialect of Ceylon. The other group is the Iranian or Persian. Thus the A. family is subdivided into 8 stocks, 2 of them Indian and the other 6 European.

The word Indo-European does not include all the languages of Europe or all the languages of India, e.g. the following European languages are not members of the A. or Indo-European languages Turkish, Hungarian, the Lapp language, the language of the Finns in Finland, and the Basque language spoken in the Pyrenes.

A new connotation was lent to the term Aryan by the so-called Aryan Paragraph, under which in Germany before the Second World War full rights were granted only to Aryans, or persons who could trace their Aryan descent back for at least a period of 100 years. The aim of this policy was anti-Semitic and the policy was a cardinal feature of Hitler's conception of a Third Reich comprising only the pure 'Nordic' peoples of W., Central, and E. Europe. At the time of its introduction there were estimated to be 800,000 Jews in Germany, and such a policy necessarily required some ethnological justification for the persecution of so large a body of Ger. citizens, including many of world distinction. The hypothesis of the Ger. people being the leading representatives of the Nordic 'Aryan' race was taken from the teaching of Gobineau (q.v.) as developed by Houston Stewart Chamberlain (q.v.), the renegade Englishman, von Ranke, Lapouge and others. Gobineau tries to explain hist. as an eternal conflict between the long-headed or dolichocephalic and the broad or short-headed or brachycephalic races, and at the apex of the world's races he places the big blond dolichocephalic or 'Aryan' race; while the later writers go still farther, and relegate the Jews or Semitic races to the Mulatto class. But hist. would seem to show that all the progressive races are composed of the same 3 stocks—Nordic, Alpine and Mediterranean—and, if this be true, the political edifice founded on race prejudice must collapse. The term Aryan, too, can only be applied to speech, and Nordic, which indicates a breed, can only be applied to race. The Jews, like the Gers., were of 2 different races: if they came from Poland they were of the Alpine stock; if from Spain they were of the Mediterranean race like the Sephardic Jews of Palestine; and broadly speaking, the term Jew should be employed only in connection with religion. Most of the

dominant European Jews are really of Alpine stock, and brachycephalic, like the rest of the mid-European peoples; and Ger. Jews, racially, were Alpines, like the S. Gers. Yiddish is merely a medieval Ger. dialect, with a considerable addition of Hebrew words. Consult Julian Huxley, A. C. Haddon, and A. M. Carr-Saunders, *We Europeans*, 1935.

**Arzamas**, see ARSAMAS.

**Arzano**, com. of Italy, 3 m. N. of Naples, containing some beautiful villas. Pop. 8000.

**Arzerum**, see ERZERUM.

**Arzeu**, Algerian seaport between Oran and Mostaganem. Has exports of salt and esparto grass. Near A. are the Kleber marble quarries, and the remains of the anct. tn. of Arsenaria. Pop. 7700.

**Arzignano**, tn., N. Italy, 11 m. S.W. of Vicenza. Has manufs. of silk and thread, and produces wine and oil. Pop. 5000; com. 11,000.



ROMAN AS

Obverse, two-faced head of Janus;  
Reverse, prow of ship.

**As**, this Rom. term had a threefold meaning. It denoted (1) a weight of 12 oz., equivalent to the *libra* or Rom. pound; (2) a copper coin, varying in weight at different periods from 12 ounces to less than half an ounce; (3) a measure equivalent to a linear foot or square acre.

**As**, riv. of W. Siberia, see Ob.

**Asa** (956-916 B.C.), third king of Judah, succeeded his father Abijah. He adopted stringent measures to cast out idolatry from his kingdom, and was a successful warrior, repulsing the Egyptians; and in alliance with Benhadad, king of Syria, defeating Baasha, the Israelite king. See 1 Kings xv.; 2 Chron. xiv.-xvi.

**Asa dulcis**, a synonym of benzoin, is a drug made from the balsamic resin of *Styrax benzoin*, a plant of the order Umbelliferae. It has a soothing effect when locally applied in cases of inflammation or abrasions of the skin.

**Asad** (1715-80), a Persian captain, was b. near Kabul. He was one of the lieutenants of Nadir Shah, and governor of one of the provs. of Persia. He afterwards became one of the counsellors of Mohammed Hassan, against whom he had previously waged war.

**Asafoetida**, a gum resin obtained from the root of *Ferula fetida*. The active principle is an ethereal oil, allyl sulphide. It acts as a stimulating expectorant, and is used in bronchial affections. It is employed, often with remarkable effect, in hysterical ailments, possibly controlling

the erratic nervous phenomena by the moral influence of its disgusting smell.

**Asam**, see ASSAM.

**Asam** was the name of a family of Ger. artists, the prin. members of which were: (1) Hans Georg (d. 1696), whose work consisted of frescoes and oil paintings. (2) Cosmo Damian (1686-1742) a painter, and Ægidius Quirinus (d. 1746), a sculptor, were both sons of Hans Georg. They worked together at the churches of Innsbruck, Munich, Schleissheim, and Mannheim. (3) Cosmo Damian had 2 sons, Franz Erasmus (1720-94), and Engelbrecht, both painters.

**Asaph**, Heb. musician of the times of David and Solomon (1 Chron. xvi. 5). He was the chief of the Levites appointed by David to minister before the ark and offer up praise and thanksgiving (1 Chron. xxv. 1), and is regarded as the founder of the 'Sons of Asaph,' a guild of singers in the second temple (Neh. vii. 44). Psalms l. and lxxii.-lxxxiii. have his name at the head.

**Asaph**, St., Welsh tn., see ST. ASAPH.

**Asaph**, St. (d. c. 596), sometimes called Asaaf, Asaa, or Asa, a Welsh saint of the sixth century, was the grandson of Pabo. He became head of the monastery at the confluence of the Rs. Clwyd and Elwy, succeeding St. Kentigern. It is most probable that he was the first bishop of the see of Llanelwy, which was afterwards known as St. A.

**Asaphus** (Brongniart), a genus of fossil Crustacea (Trilobites), most abundant in the lower Palæozoic strata. *A. buchii* marks the Cambrian or Lower Silurian beds, and *A. caudatus* the Upper Silurian beds.

**Asar**, or **Cesar**, the Swedish name for the long, winding ridges of gravel and sand found in the low-lying parts of Sweden. These ridges sometimes extend for more than 100 in., one main ridge being joined by many trib. ridges. The appearance that these have to a riv. delta has given rise to the belief that the deposits were formed by streams underneath the ice-sheets which covered Sweden during the Glacial Period, and that the direction of the ridges may mark the site of subglacial rivers. Similar ridges of gravel and sand are found in Ireland, where they are called eskers, and in Scotland, where the name kames is given to them, and in the N. states of N. America. Also a Persian gold coin formerly worth about 6s. 8d.

**Asarabacca**. Eng. name of *Asarum europæum*. It is a plant which grows in woods in the N. of England and in Scotland, and the leaves are used as snuff.

**Asarin**, or **Asarone**, a preparation from the plant *Asarum europæum*, smelling like camphor.

**Asben**, see AIR.

**Asbestos** (Gk., unquenchable), the name applied to varieties of fibrous minerals which offer great resistance to heat through their unflammability and poor conductivity. It is a variety of hornblende containing a considerable percentage of magnesia in its composition. The fibres can be woven in cloth, which was used by the ancients to enclose dead bodies

when placed on the funeral pyre, so that the ashes might be retained. The varieties used in manufs. are obtained from chrysolite, a variety of serpentine; and from tremolite and actinolite, varieties of amphibole. The chrysolite A. is yellowish in colour and is extensively worked in the prov. of Quebec, Canada. Amphibole A. is usually white, grey, or blue, and is worked in Corsica, Hungary, Russia, Grignaland W., New S. Wales, and Cyprus (export increased from £25,000 in 1919 to £292,000 in 1929). A. is also produced in considerable quantities in S. Rhodesia, and it is one of that country's chief exports. The crude A. is crushed between rollers with a double movement, so that the fibres are well divided, and then screened.

A. is a poor conductor of heat and electricity, resists the action of many acids, and is incombustible. It may be woven into fabrics, which have been used for firemen's clothing and furnace-men's gloves. Made into felt, it is used for fireproof walls, floors, and roofs. Packing made of A. is used for covering steam-pipes and boilers, fireproof safes, and in the construction of safety curtains for the stages of theatres and music-halls. A. paint is used for covering woodwork in order to make it uninflamable, and A. putty is used for joints, etc. A. is also employed for the manuf. of cloth filters for use with corrosive liquids, and for covering rollers in textile printing works to resist the action of corrosive dyes. Mixed with fireclay, it is rolled into balls and used to radiate heat in gas fires.

**Asbjørnsen, Peter Christen** (1812-85), Norwegian writer and folklorist. After studying at the univ. of his native city, Christiania (now Oslo), served for some years as a country tutor, giving much time to the study of the poetry and folklore of the peasantry. He subsequently returned to Christiania, where he studied medicine and science. From 1816 to 1853 he was engaged by the Norwegian Gov. in scientific work on the coast. Later, he became a gov. inspector of forests. He retired from the gov. service in 1876. In addition to sev. handbooks and memoirs on scientific and practical subjects he wrote in collaboration with his lifelong friend, Jørgen Ingebrektsen Moe, the collection of Norwegian fairy tales which appeared under the title of *Norske Folkeeventyr* (1st series, 1842; 2nd series, 1844; 3rd series, 1871). In 1845 he pub. alone the first book of the *Norske Huldreeventyr og Folkesagn*. The second part appeared in 1848. In these delightfully written classics may be traced much of the modern national spirit in Norwegian literature. They have been trans. into Eng. in Dasent's *Popular Tales from the Norse* (1859; new ed. 1903), and *Tales from the Field* (1874); also Brackstad's *Round the Yule Log* (1881). See Sinding-Larsen and Asbjørnsen's *P. C. Asbjørnsen: Fra Asbjørnsen's Turidill* (1884).

**Asbury, Francis** (1745-1816), first Methodist bishop of the U.S., b. at Hathersworth, England; sent to America in

1771 as Wesleyan missionary, in which capacity he showed untiring zeal and energy. He d. at Richmond, Virginia. See his *Journal* (1852), and Strickland's *Pioneer Bishop* (1858).

**Asbury Park**, a city of Monmouth co., New Jersey, U.S.A., 25 m. from New York City. It is a favourite seaside resort. Pop. 15,000.

**Ascalon** (modern **Askulan**), on the Mediterranean, 12 m. N. of Gaza, and 40 m. S.W. of Jerusalem, one of the 5 chief cities of the Philistines, and the seat of the worship of the Syrian goddess Derceto. It was the bp. of Herod the Great, who did much to beautify it. After the disruption of the Macedonian empire it became trib. in turn to Egypt and Syria. During the crusades it suffered many vicissitudes. In 1099 the Christians gained a victory outside its walls. In 1157 it was captured from the caliphs by Baldwin III., king of Jerusalem. Captured by Saladin in 1187, it later fell into the hands of Richard Cœur de Lion. Its fortifications were finally destroyed by the Sultan Bibars in 1270. From A. is derived the name of the eschalot or shallot, a kind of onion originally grown in the surrounding country.

**Ascania**, the name of a Ger. dynasty founded in the twelfth century by Albert the Bear, first margrave of Brandenburg, whose castle, near Aschersleben, bore this name. This ruling house was closely connected with that of Anhalt.

**Ascanius or Iulus**, in Lat. mythology, the son of Aeneas and the ancestor of the Julii. He accompanied his father on his flight to Italy from Troy, and later founded Alba Longa.

**Ascapart**, a giant, 30 ft. high, who figures in the medieval romance *Bevis of Hampton* (q.v.).

**Ascaris** (Gk. *ἀσκαρίς*), a kind of worm, a genus of thread-worms, or Nematoda, which include sev. intestinal parasites, sometimes of considerable size. *A. lumbricoides*, the roundworm found in man, may attain 14 in. in length; *A. megalocephala*, found in horses and cattle, 17 in. *A. mystax* occurs in dogs and cats.

**Ascasubi**, Colonel Don Hilario (b. 1807), a Sp.-Amer. poet, was b. at Buenos Aires. He took an active part in the contests against Quiroga and Rosas, and realised his political ambitions by the separation of the confederated provs. His studies of the lives of the gauchos bore fruit in his poems, which may be called romances of the pampas. In 1864 he attended the Confederation of Paris as Argentine ambas.

**Ascendant**, see **ASTROLOGY**.

**Ascension**, Brit. is. of volcanic origin, situated in the S. Atlantic, lat. 7° 53' S. and long. 14° 18' W. 760 m. N.W. of St. Helena, 7½ m. long by 6 broad, with an area of 34 sq. m. The is. derives its name from the fact of its having been discovered on Ascension Day, 1501, by the Portuguese navigator, Juan de Nova. It was occupied by the Brit. in 1815 in connection with the captivity of Napoleon at St. Helena, and until 1922 it was under

the supervision of the Admiralty, who maintained a small naval station there. In Sept. 1922, it was made a dependency of St. Helena and placed under the control of the Colonial Office. It is a barren, rocky peak of purely volcanic origin and destitute of vegetation, except at the highest elevation, but has been cultivated to an extent permitting the maintenance of 300 sheep and the growth of shrubs and various vegetables. The climate is very healthy. There is a sanatorium at Green Mt. (2870 ft.), the highest point of the is. Green turtles, land-crabs, and fish are abundant. Noted, too, for its tern. George Town, in the N.W., supplies the only good anchorage. It is connected by telegraph with St. Vincent, St. Helena, and Sierra Leone and is an important station of the E. Telegraph Company. Pop. estimated about 320. See Darwin, *A Naturalist's Voyage*, 1889.

**Ascension Day**, or Holy Thursday, the festival of the Church which commemorates Christ's A. into heaven 40 days after the resurrection, and consequently celebrated on the fortieth day after Easter. The anct. ceremony of heating the bounds is still observed on this day, though the religious connection is obscure.

**Ascension, Right**, in astronomy, the distance of a heavenly body from the first point of Aries, measured upon the equator. The celestial equator is half-way between the 2 celestial poles, and the celestial meridian is a line (an arc) drawn through a point on that equator. This point, the celestial Greenwich, is known as the first point of Aries (the Ram, the first of the zodiacal signs). The R. A. of a star means therefore the distance in degrees on the celestial equator of an intersecting arc (drawn from the Pole through the star) from the celestial meridian—in other words, its celestial long. In every hour of time 15° of equatorial arc passes the meridian, so that if the first point of Aries passes the meridian at 12 o'clock midnight, the bright star Capella, which has a R. A. of 79° was on the meridian 5 hrs. 16 min. earlier. The adjective 'right' which is always used with the term A. is used in the sense of 'proper,' and means that the calculation is made on a *right* sphere, that is, one in which the polar axis corresponds with the polar axis of the heavens.

**Ascetism**. This word, derived from the Gk. ἀσκησις, which signifies the training and discipline undergone by athletes preparing for games, is applied to those practices and beliefs which have as their foundation the idea of the eternal antagonism of spirit and matter, and of the need of the suppression of bodily desires for the purification of the spirit. Mainly of oriental origin, the idea has undergone various modifications at different times, amongst different peoples, and in different religions. Consisting in its lower stages of such mortifications of the flesh as fasting, flagellation, and torture, we find it to include in its higher stages the uprooting of worldly thoughts and separation from the ordinary relations of life. In the schools of Gk. philosophy

varying forms of A. are to be found in the teachings of the Socratic school, with its view of the soul as imprisoned in the body, of the Stoics and Cynics, with their contempt for the material refinements and comforts of life, and of the Neo-Platonists, who regarded marriage and meat-eating as obstacles in the way of the attainment of divinity. In the religion of the early Egyptians we can trace the ascetic tendency in the practices of circumcision, fasting, and abstinence from all uncleanness. Amongst the Jews ascetic practices seem to have been confined rather to special classes, such as the prophets, and to times of special distress and urgency, the more pronounced form of eremitism not appearing until shortly before the time of Christ amongst the Therapeutæ in Egypt and the Essenes in Palestine. Its most acute forms are to be met with in the self-mortification of the Hindu fakirs and dervishes, while we may look for its most spiritual manifestations in the meditations and penances of the Buddhists and Persian Sufis. With the earliest Christians A. evinced itself in celibacy, poverty, fasting, wearing of sackcloth, night vigils, and other similar practices, gaining in strength from the belief in the early reappearance of Christ. Fanatical extremes of self-mortification were reached by such men as Anthony the Hermit, Paul of Thebes, and Simeon Stylites. But with the decay of the spiritual life of the Christians the idea may be said to have crystallised itself into monasticism, the most highly organised form of A. The tendency to extreme A. was early attacked in the Christian Church by healthy minds of the type of Jovianus and Vigilantius, and this opposition, growing in the hands of such men as Peter of Bruys, Henry of Lausanne, Wycliffe, and Jerome of Prague, culminated in the Reformation of the sixteenth century. But the ascetic idea, though dethroned from supremacy in its monastic garb, has continued to play an all-important part in Christian belief and practices. At the basis of the Christian code of conduct, it has assumed in modern times definite shape in many of the doctrines of Puritanism, Quakerism, and Methodism, being familiar to us in sabbatarianism, and opposition to theatre-going, dancing, and card-playing.

**Asch**, chief tn. of the dist. of A., in Czechoslovakia, 14 m. N.W. of Eger. Has manufs. of silk, cotton, woollen goods, and lace, and bleaching, dyeing, and brewing industries. Pop. 22,900.

**Aschaffenburg**, tn., Bavaria, in dist. of Lower Franconia, 25 m. S.E. of Frankfurt. Before 1939 it had manufs. of paper, tobacco, clothing, and cellulose. It was the site of a Rom. fortress. The Renaissance castle of Johannisburg overlooks the tn. Pop. 37,000.

**Ascham**, Roger (1515–68), Eng. classical scholar and writer, was a native of the Yorkshire vill. of Kirby Wiske, near Northallerton. He was adopted by Sir Anthony Wingfield, who had him educated with his own sons. Impressed by A.'s scholarship his patron sent him in

1530 to St. John's College, Cambridge, where he proved himself a brilliant classical student and gained a fellowship. He took his B.A. degree in 1534, and his M.A. in 1537. The fame of his knowledge of Gk. brought him many pupils. The year 1545 saw the publication of his delightful prose treatise on archery, *Tozophilus*, which secured for him the favour of Henry VIII. and a pension of £10. In 1546 he succeeded Sir John Cheke as public orator of his univ., and in 1548 became tutor to the Princess Elizabeth, an appointment which he relinquished 2 years later owing to a quarrel with the lady's steward. From 1550 to 1553 he was in the suite of the Eng. ambas. at the court of Charles V., during which time he visited various places on the Continent, including Italy. In 1553 appeared his *Report on the Affairs of Germany*. During his absence abroad he was appointed Lat. secretary to Edward VI., an office which, through Bishop Gardiner's influence, he was able to continue under Mary in spite of his Protestant views. Under Elizabeth he became secretary and tutor, retaining these offices till his death. His chief work, *The Scholemaster* (ed. by Prof. Mayor, 1863), a treatise on education, was pub. by his widow in 1570. His letters are to be found in Dr. Giles's ed. of his works (3 vols., 1864-65). See also Katterfeld's *Roger Ascham*, 1879.

**Aschersleben**, tn. of Saxony, Germany, transferred after the liquidation of Prussia to the Soviet zone of occupation (1945); 36 m. N.W. of Halle. Had woollen, sugar, metal, and chemical manufs., and brine baths. Pop. 24,400.

**Asclano**, tn. of Tuscany, in prov. Siena. Contains sev. fine fourteenth-century churches. Remains of Rom. baths were found in 1898. Pop. 8300.

**Asciadiacea** (Gk. *asciadior*, little bottle), the sea-squirts, an order of Tunicates which may be fixed and individual, free-swimming and colonial; the adults have neither a tail nor a notochord. *Molgula* and *Ascidia* are genera.

**Ascite** (Gk. *ascis*, skin-bag), or abdominal dropsy, is caused by an abnormal collection of serous fluid in the peritoneal cavity. The fluid, which coagulates on standing, is usually clear and of a pale yellow colour.

**Asclepiadaceae**, an order of dicotyledonous plants resembling very closely the Apocynaceae. The reproductive organs are extremely curious; the 2 carpels are free at the base, but unite in 1 style, and to the edge of the stigma the anthers of the 5 stamens are joined. The plants are insect-pollinated. The flower is regular and hermaphrodite, the calyx has 5 free sepals, and the corolla 5 joined petals. Many species grow in N. America, and *Asclepias tuberosa* is largely cultivated in Europe.

**Asclepiades**: 1. A Gk. lyric poet of Samos, who fl. in the second century B.C. Supposed to have been the master of Theocritus and inventor of the metre called after him, *metrum Asclepiadeum*. The Gk. Anthology contains

39 epigrams ascribed to him. 2. A famous physician of Prusa, in Bithyria, who settled in Rome and founded the Methodical school of medicine. His treatment, consisting of open-air exercise, bathing, and change of diet, was based on the theory that disease is caused by the irregular distribution of the corpuscles of the body.

**Asclepiad**, a form of metre in poetry which derives its name from the Gk. poet Asclepiades. It consists of 12 syllables accented as follows: spondee, 2 choriambi, and an iambus (— | — — | — — | — — | — —). This is known as the little asclepiad, in contradistinction to the greater, which has 3 choriambi in the middle of the line. The asclepiad is not a common form, the Rom. poet Horace only employing it in 3 of his odes.

Example of the little asclepiad:

Dună | rēm pătērās || grătăquē cōm |  
mōdūs  
Cēnsō | rīnē mōis || rērā sōdā | ūbūs.  
(iv. 8.)

Example of the greater asclepiad:

Ō crū | dēlls ādhūc || ēt Vēnēris ||  
mūnērībūs | pōtēs  
Inspē | rātā tūm || quūm vcnlēt || plūmā  
sūpēr | blā.  
(iv. 10.)

**Asclepias** (milkweeds), a genus of tropical plants, the type of the order Asclepiadaceae. Many possess medicinal properties, and the name is derived from Æsculapius, the god of medicine. *A. syriaca* is the Syrian swallow-wort; *A. tuberosa* is the N. Amer. butterfly weed; *A. incarnata* is the swamp milkweed, cultivated in Britain.

**Asclepius**, see ÆSCULAPIUS.

**Ascoli**, David d', Jewish author of the sixteenth century. He issued a manifesto against Pope Paul IV. for unfair measures against the Jews, and was the author of *Apologia Hebræorum* (Strasburg, 1559).

**Ascoli**, Francesco (Cecco) Stabili d', (1257-1327). It. poet and astrologer, incurred the enmity of the Inquisition, was driven from the professorship of astrology at Bologna, and finally burnt at the stake.

**Ascoli**, Graziadio Isaia (1829-1907). It. philologist, was b. at Görz, the son of Jewish parents. As a result of his *Studi Orientali e Linguistici*, he was in 1861 appointed prof. of philology at the Milan Academy, which position he held till 1902. His chief work was *Fonologia Comparata del Sanscritto, del Greco, e del Latino*, 1870. He also pub. *Lettere Glottologiche*, 1886, and articles in the *Archivio Glottologico* of Milan.

**Ascoli Piceno**, city and prov., Central Italy (the Marche). The prov. has an area of 798 sq. m., and a pop. of 250,000. The city, on the R. Tronto, is built on the site of the ant. Asculum Picenum, and contains various architectural remains of Rom. times. Constantine the Great is said to have built the cathedral. The city has manufs. of glass, pottery, majolica, paper, etc. In the Second World War its most notable bridges were destroyed by the Gers. Pop. 39,000.



**Ascoli di Satrignano**, episcopal city, prov. of Foggia, S. Italy, 19 m. S. of Foggia. Supposed to be the site of the anct. Asculum Apulum or Satranium, the scene of the defeat of the Romans by Pyrrhus (279 B.C.). Pop. 8400.

**Ascomycetes**, a large group of fungi whose spores are contained within asci or tubes. In the group are such forms as truffles and morels.

**Asconius Pedianus, Quintus** (2 B.C. to A.D. 83), was the author of valuable commentaries on Cicero, which have helped to clear up many obscurities. The MS. was discovered by Poggio Bracciolini in 1416, and has been well ed. by Orelli and Baizer in their ed. of Cicero. See also Madvig's *De Asconii Pediani Commentariis Disputatio* (Copenhagen, 1828).

**Ascot Heath**, Berkshire, 6 m. S.W. of Windsor, is famous for its circular race-course, nearly 2 m. long, the scene of the annual Ascot meeting in June. King Edward VII. took great interest in the alteration and improvement of the course in 1902.

**Ascot Vale**, suburb of Melbourne, Australia, on Saltwater R.

**Asculum**, anct. name of Ascoli, (*q.v.*).

**Asellio, Gasparo** (1521-1626), It. surgeon, is best known by his discovery of the lacteal vessels, on which subject he wrote his *De Lactibus* (Milan, 1627). He was for some time prof. of anatomy and surgery at Padua.

**Asellus** (Lat., little ass), a small isopod crustacean commonly found in ponds and stagnant water in Britain. It belongs to the family Asellidae, and is allied to the wood-lice.

**Asepsis**, the absence of injurious microorganisms. A condition is said to be *aseptic* when no pathogenic germs are present; *antiseptic* when there is present some substance designed to destroy or prevent the development of such germs.

**Ases**, or **Æsir**, a name of a race of gods in Scandinavian mythology. Odin was their chief, and Thor, Balder, Bragi, Heimdal, and Loki were the next in importance; the chief goddesses were Freyja, Frigg, Saga, Snotra, and Idun. Their home was Asgard (*q.v.*).

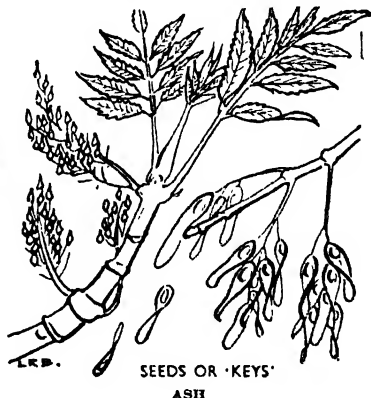
**Asexual**, a biological term applied to plants and animals which can reproduce their kind and are yet devoid of sex. In the case of some algae (plants which include sea-weeds), *e.g.* *Ullothrix*, a cell will produce sev. ciliated spores which either form new plants by themselves, or by fusion with identically similar (and consequently sexless) spores. The case of some animals, *e.g.* *Amœba*, the solitary cell divides in two, thus forming 2 individuals; this process is known as *self-division*, and occurs also in low plant life. Budding or germination is the outgrowth of buds on a parent plant or animal which form new life of a similar character.

**Asgard**, lit. the tn. of the Æsir, was, according to Scandinavian mythology, the home and habitual residence of the gods, or Æsir. Like the Gk. Olympus it rose from the earth, called midgard or middle world. Here Odin and the

12 Æsir dwelt, assembling in council every day under Yggdrasil, the ash-tree. The mansion of the gods was called Gladsheim, that of the goddesses Virgulf; here also was Walhalla, the home of heroes slain in battle.

**Asgill, Sir Charles**, son of the first baronet, was taken prisoner in the Amer. war of Independence, and chosen by lot to be executed in the place of Capt. Lippincot, whom the Eng. refused to yield to Washington for hanging an Amer. officer. A. was ultimately released, and became a general.

**Asgill, John** (1659-1738), pamphleteer and lawyer, acquired great notoriety as the author of the pamphlet *An Argument*, etc., which denied the necessity of death, and maintained that heaven was attainable without passing through death. For this he was expelled in turn from the Irish (1703) and Eng. (1707) parliaments. He was ultimately imprisoned for debt, but continued to issue pamphlets from the Fleet prison.



**Ash**, the name applied to sev. plants of the order Oleaceæ and genus *Fraxinus*, which are related to the olive, privet, and lilac. *F. excelsior* is the common A.; *F. ornus* is the manna A. or flowering A. of S. Europe. The fruit of the A. is winged for wind-distribution, and the wood provides an excellent timber. The prickly A. of America belongs to the same order, and is called *Xanthoxylum americanum*.

**Ash of Jerusalem**, old term for woad or dyers' weed.

**Ash, Edward** (d. 1829), an Eng. physician, is known because of his discovery that every time metals which are unequally oxidisable are brought in contact, electricity is generated; this is the base of the galvanic battery.

**Ash, Mountain**, or Rowan-tree, is the *Pyrus aucuparia* of the order Rosaceæ, and is related to the pear and apple. The fruit is leathery.

**Ash-Wednesday**, the first day of Lent,

derives its name from the Catholic ceremony of sprinkling on the heads of penitents ashes from the burning of the undistributed branches of consecrated palm. The custom is said to have been instituted by Gregory the Great, and was finally sanctioned by Pope Celestino III. in 1191.

**Ashango**, the name of an African tribe of the Fr. Congo. There are sev. sub-tribes, including the pigmy Obongos. The As. are fetish-worshippers and slaveholders, and are remarkable for being fully clothed.

**Ashanti**, a co. of the Gold Coast Colony, W. Africa, consists largely of forest country. It is divided into 2 provs., the E., with headquarters at Kumasi, and the W., with headquarters at Sunyani; each of these being subdivided into dists. under commissioners who exercise limited jurisdiction. The country is inhabited by a large number of confederated tribes, the prin. of which are the Bekwais, Kokofus, Nkwantas, Kumasis, Agunas, Mampons, Nautas, Kumawus, Bompatas, Juabins, and Adjesus. Each tribe has its own head chief, but from time immemorial the king of Kumasi was recognised as the king paramount of the confederation. The country is hilly, and, on the whole, unhealthy. The land is fertile and well cultivated near the tns., producing, amongst other things, rice, maize, millet, cocoa, sugar, fruits, gums, and timber. Gold, rubber, kola, and cocoa are exported in considerable quantities. Kumasi (Coomassie) is the chief tn. Until 1896, when it became a Brit. protectorate, A. was a separate native kingdom. The As. have long been noted for their warlike and predatory tendencies. Their incursions on the Fantis led to the first Brit. expeditions, 1807-11. In 1874 Sir Garnet Wolseley captured and burned Kumasi. Another expedition, in 1895-96, ended in the removal of the king, Prempeh, and the establishment of the protectorate. Further troubles were suppressed by the expedition of 1900, and the country was definitely annexed by Great Britain in 1901. Before the Brit. settlement, human sacrifices were a regular part of the fetish religion. The As., according to tradition, derive their origin from the fugitives driven southwards about 300 years ago by Moslem tribes from Senegal and the Niger. Kumasi, the cap., with 40,000 inhab., has buildings which would compare with many in the more popular thoroughfares of London. Yet but a couple of hrs.' journey northward, elephants, buffalo, and bongo still roam the country and, startled by the whirr of motor cars on the fine motor-roads (of which there are now some 1160 m.), turn back into their ever-narrowing lairs. Some thousands of children are taught either in the gov. or missionary schools of A. In Kumasi may be seen African gentlemen possessed of various academic qualifications, and dressed in European garb. The native women also are dressed in London and Paris frocks, with silken stockings and high-heeled shoes. This new generation rubs shoulders with the

older, composed of grey-haired aristocrats in woven togas, and chiefs borne along in hammocks covered with leopard skins, men who formerly took part in the human sacrifices which made A. once a by-word. The whole secret of the change would seem to be the prosperity which has come with the cocoa trade, the wealth from which has built schools and roads and railways. Agriculture is expanding and coffee plantations are also being formed. There are rich forests of mahogany and cedar. The annual gold output is valued at £500,000. Railway tracks traverse the once forbidding Prah. Kumasi is the railhead of 2 lines which link up the coast now only 12 m. distant. A great motor-road passes N. over swamps, escarpments, and rivs. to emerge from the forest belt into a land of open orchard country. Pop. 578,000 (650 Europeans). The peaceful relations which, under the Gold Coast Gov., have been maintained for many years between A. and the neighbouring tribes have been marked by frequent petitions from the Gold Coast Colony as well as from A. for the return from exile of Prempeh, the former chief of Kumasi. The Gold Coast Gov.'s confidence in the loyalty of the As. led to the granting of this request in 1924 and to approval being given in 1926 of his election by the As. as head chief of the Kumasi tribe. Prempeh d. in 1931, and was succeeded by his nephew, Osei Agyeman Prempeh II., as Omanene of Kumasi, July 7, 1931. In 1935 the Golden Stool of A., which since the seventeenth century has been accepted as the symbol of the soul of the A. nation, was restored to the A. people, when Osei Agyeman was proclaimed the new Ashantibene (or A. overlord) Prempeh II. In effect the restoration marked the revival of the old A. confederacy for purposes of domestic policy. The Golden Stool is so named because it is covered with plates of pure gold and hung with golden balls.

**Bibliography.**—J. Dupuis, *Journal of a Residence in Ashanti*, 1824; H. J. Ricketts, *Narrative of the Ashanti War*, 1831; J. Beecham, *Sketch of Ashanti*, 1841; J. D. Hay, *Ashanti and the Gold Coast*, 1873; H. Brackenbury and E. L. Haythe, *Fanti and Ashanti*, 1873; A. C. Heaton, *The Ashantees*, 1873; H. Brackenbury, *The Ashanti War* (2 vols.), 1874; C. C. Reinhardt, *History of the Gold Coast and Ashanti*, 1895; R. S. S. Baden-Powell, *The Downfall of Prempeh*, 1896; H. R. Beddoes, *The Military Operations in Ashanti*, 1900, 1901; A. C. E. Armitage and A. F. Mountanaro, *The Ashanti Campaign of 1900*; F. W. Claridge, *History of the Gold Coast and Ashanti* (2 vols.), 1915; H. S. Rattray, *Ashanti*, 1923, and *Religion and Art in Ashanti*, 1927.

**Ashbourne**, or **Ashborne**, mkt. tn. Derbyshire, on the Dove, 13 m. N.W. of Derby. The fine cruciform church, dating from the thirteenth century, has a beautiful spire, over 200 ft. high, which is known as the 'Pride of the Peak,' and a fine monument by Banks. The tn. has a

grammar school, founded in 1585. Two engagements took place here during the Civil war. Pop. 4500.

**Ashbourne, Edward Gibson**, first Baron (1837-1913), was born at Dublin. He was M.P. for Dublin Univ., 1875-85; attorney-general for Ireland, 1877-80; lord chancellor of Ireland, 1885-92, and 1895-1906. He was created a baron in 1885, the year of the passing, under his guidance, through Parliament of the Land Purchase Act known as the Ashbourne Act.

**Ashburnham, John** (1603-71), friend and agent to Charles I., assisted that monarch in various negotiations of the Civil war, including the treaty of Uxbridge and the visit to the Scots army. He contrived the king's flight from Hampton Court. He was banished after Charles's death, but returned at the Restoration.

**Ashburton, a tn., S. Devonshire**. It became a town, 10 m. N.W. of Totnes. It became a stannary tn. in 1328 by a charter of Edward III. It has a fine cruciform church, St. Andrew's. Until the Reform Act of 1832 it returned 2 members to Parliament; from then till 1868 one. Pop. 2500.

**Ashburton, a tn., co. of A., S. Is.**, New Zealand, on the A. H. 50 m. S.W. of Christchurch. Pop. 13,000.

**Ashburton River**, N.W. of W. Australia, 400 m. long, flows into the Indian Ocean near Exmouth Gulf.

**Ashburton, Alexander Baring**, first Baron (1774-1848), son of Sir Francis Baring, founder of the famous banking house of Baring Brothers, succeeded his father in 1810 as head of the business. From 1806 to 1832 he was the Liberal member for Taunton, Callington, and Thetford. In 1833 he became the moderate Conservative member for N. Essex. He was president of the Board of Trade in Peel's gov., 1834-35, and was created a baron in 1835. As special commissioner to the U.S.A. he concluded the A. treaty of 1842, which settled the N.W. frontier between Canada and the U.S.A.

**Ashburton, John Dunning, Baron** (1731-1783), a distinguished lawyer, became successively recorder of Bristol, 1766; solicitor-general in the duke of Grafton's administration, 1767; M.P. for Calne, 1768; chancellor of the duchy of Lancaster, and privy councillor. He was created a baron in 1782. See Henry Roscoe, *Lives of Eminent British Lawyers*, 1830.

**Ashburton, William Baring**, second Baron (1799-1864), is best remembered for the *salon* of his first wife, who entertained many distinguished politicians and writers.

**Ashbury, par. and vil., Faringdon dist., Berkshire, England**, 6½ m. E. of Swindon. Near it is Wayland Smith's forge. Pop. 500.

**Ashby-de-la-Zouch, mrkt. tn., Leicester-shire**, 16 m. N.W. of Leicester. Has manufs. of leather goods and hats. The name derives its suffix from the Norman family of La Zouch, who built a castle here. The castle was rebuilt in the fifteenth century by Sir William Hastings, and served for some time as a prison of Mary Queen of Scots. It was demolished

by the parliamentarians during the Civil war. The fine old church of St. Helen contains a 'finger pillory' and the tombs of the Hastings or Huntingdon family. The Ivanhoe saline baths, built in 1826, have been much frequented for their cures in rheumatic and scrofulous complaints. Pop. 5000.

**Ashdod** (modern Isdud, or Esdud), Palestine, 22 m. S.W. of Joppa, now a mud vil., was formerly one of the chief Philistine cities. The Philistines brought here the ark of the covenant and placed it in the temple of Dagon. It figures in the N.T. under the name of Azotus. It was captured by the Assyrians in the eighth century, and by the Egyptians in the seventh century. After being sacked by the Maccabees it was rebuilt by the Romans.

**Ashdown Park**, seat of the Earl of Craven, W. Berkshire, 3½ m. N.W. of Lambourne. In the vicinity is the supposed site of Ethelred and Alfred's great victory over the Danes in 871, and the cromlech known as Wayland Smith's cave.

**Ash, Simeon** (d. 1662), nonconformist divine, educated at Emmanuel College, Cambridge. When the Civil war broke out he became chaplain to the earl of Manchester, and after the war became rector of St. Austin and a Cornhill lecturer. He was a moderate Cromwellian, and was among the divines who went to meet Charles II. at Breda. Joint author with William Goode of *A Particular Relation of the most Remarkable Occurrences from the United Forces in the North*, and author of *A True Relation of the most Chief Occurrences of and since the late Battell at Newbury, 1644*, both vindications of the earl of Manchester; and sev. sermons.

**Asher** (Heb., blessed), one of the tribes of Israel, whose lands reached from Lebanon to Dor; descended from A., the eighth son of Jacob, borne to him by Zilpah, the handmaid of Leah. A genealogy of A. may be constructed from Gen. xlii. 17; Num. xxvi. 44; 1 Chron. vii. 30. It is also mentioned in Gen. xxx. 13; Judges vi. 35, and vii. 23; and Joshua xix. 24-31, where the ter. of the tribe is given. As few of the places named have been identified, the locality is doubtful, but was probably in S. Palestine.

**Ashera**, a goddess of the Phœnicians, or the idol which she symbolised. Mentioned in the O.T., and it is probable that she was associated with tree-worship. It is trans. 'grove' in the A.V. The rites were associated with the worship of Astoreth, from which the former name is supposed to be derived.

**Ashes**, the residue from the burning of animal and vegetable matter, and to a certain extent of mineral bodies also. Vegetable A. are composed of oxygen, hydrogen, and carbon. Animal A. consist principally of phosphate of lime, with traces of salts of lime, magnesia, and soda. Mineral A., such as those of Vesuvius, are found to contain alumina, oxide of iron, charcoal, and potash among other ingredients.

**Ashes**, The, the mythical trophy for which England and Australia compete in test match cricket. Its origin goes back to 1882 when Australia beat England at the Oval, and a sporting jour. published a mock In Memoriam notice: 'In loving memory of English cricket, which died at the Oval on Aug. 29, 1882. The remains will be cremated and the ashes taken to Australia.' Since then in every season, when a series of test matches are arranged between the 2 countries, the teams are said to be competing for the A.

**Asheville**, co. seat of Buncombe co., N. Carolina, U.S.A., at junction of Swannanoa and Fr. Broad Rs., 210 m. W. of Raleigh. Situated in a picturesque climate, it is a favourite health resort. It has manufs. of cotton, tobacco, leather, and machinery. Pop. 51,000.

**Ashfield**, a manufacturing and residential suburb of Sydney, New S. Wales, Australia. It is about 5 m. from Sydney to the S. Pop. 40,460.

**Ashfield**, Edmund (fl. 1680-1700), an Eng. painter, pupil of Michael Wright. He was, according to Horace Walpole, equally clever with oils and pastels.

**Ashford**, a mkt. tn. in Kent, on the R. Stour, 14 m. from Canterbury. It has a fine old church, and the tn. does a large trade in brewing, brickmaking, and tanning, among other industries. At the new end of the tn. there are large railway workshops. Pop. 15,200. Municipal bor., 44,000.

**Ashik** (1513-71), a Persian poet. He held sev. important posts in the gov. of his time, and occupied his leisure by writing poetry. His prin. work is a *Book of Poets*.

**Ashikaga**, a tn. in Japan, about 70 m. from Tokio. Founded in the 8th century, it was once the seat of an anct. academy of Chinese lore, and a statue of Confucius is still existent here. A big trade was done in cotton and silk before 1941. Pop. 45,000.

**Ashington** (anct. *Assandun*), a vil. in Essex, England, where Edmund Ironside was defeated by Canute in 1016.

**Ashington**, a tn. of Northumberland, Eng., 4 m. from Morpeth. Centre of a coal-mining dist. Pop. 30,000.

**Ashira**, a Bantu tribe inhabiting the coastal dist. W. of the Fr. Congo, and between the Congo R. and the Equator. They are coal black and of good physique, and are skilful workers in iron and copper, and in cloth-weaving.

**Ashkenaz**, a N. race mentioned in Gen. x., who lived in Armenia. They were supposed to be descended from Gomer.

**Ashland**: 1. A city, Ashland co., Wisconsin, U.S.A., situated on an arm of Lake Superior. It has large iron and timber industries. Pop. 11,000. 2. A city of Boyd co., Kentucky, U.S.A., with a large trade in iron and woollen goods. Pop. 29,000. 3. A tn. in Oregon, U.S.A., a popular health resort. Factories. Pop. 4,000. 4. A bor. of Schuylkill co., Pennsylvania, U.S.A., 12 m. N.W. of Pottsville. Has coal mines and machine

shops. Pop. 3,000. 5. A vil. of Hanover co., Virginia, U.S.A., 17 m. N.W. of Richmond; the seat of the Randolph-Macon College. Pop. 1,300.

**Ashlar**, a squared building stone used in masonry. It is laid in regular courses and used direct from the quarry unprepared.

**Ashley**, Anthony, see SHAFTESBURY, EARL OF.

**Ashley**, Lord (1621-83), Eng. politician, was the early title of Anthony Ashley Cooper, first Earl of Shaftesbury (q.v.).

**Ashley**, Sir William James (1860-1927); prof. of hist. at Toronto, and later at Harvard and Birmingham Univs. Wrote much on hist. and political economy. His works include: *Introduction to English Economic History and Theory*, 1888-93; *The Tariff Problem*, 1903; *Progress of the German Working Classes*, 1904. Knighted 1917. Rendered service on committees on prices during the First World War.

**Ashmole**, Elias (1617-92), an eminent antiquary, the founder of the Ashmolean Museum at Oxford. He was b. at Lichfield. He studied law, and in 1638 became a solicitor in Chancery. In 1631 he was sworn an attorney of the Common Pleas. In 1645 he became one of the gentlemen of the ordnance in the garrison at Oxford, and afterwards entered Brasenose College, applying himself to natural philosophy, mathematics, and astronomy. In 1660 Charles II. appointed him to the position of Windsor herald. He was called to the bar in the same year and made an F.R.S. A fire in 1679 lost him the greater part of his library. In 1682 he presented to Oxford Univ. the collection of curiosities which he had received from John Tradescant of Lambeth, the celebrated gardener, and from the latter's father. His writings include *Fasciculus Chemicus* or *Chemical Collections*, *Theatrum Chemicum Britannicum*, and *The Way to Bliss*, a treatise on the philosopher's stone.

**Ashmolean Museum**, at Oxford, founded in 1679 by Elias Ashmole, and up to 1894 kept in a house in Broad Street. The natural hist. exhibits were then taken to the Univ. Museum, and the rest of the collection to the new Univ. Galleries in Beaumont Street. The Selden and Arundel marbles are among the most valuable exhibits possessed by this museum, and there is an interesting collection of Sumerian antiquities gathered at Kish, Iraq.

**Ashmunein**, a small vil. of Upper Egypt. It is situated a few m. from the l. b. of the R. Nile. It possesses the anct. ruins of Hermopolis Magna.

**Ashokan Reservoir**, a reservoir constructed 13 m. W. of Kingston, New York, for collecting the main part of the New York water supply from the Schoharie, Esopus, and Catskill watersheds. Approximately 12 m. by 1 m. with a maximum depth of nearly 200 ft.

**Ashover**, a par. of Derbyshire, near Chesterfield, which manufs. lace and hosiery. Pop. 2,500.

**Ashraf**, a small scattered tribe of African Arabs. They inhabit a region near Tokar, and the Amarar country to

the N. of Suakin. They claim descent from Mohammed, hence their self-designated name (Shurata), Sheriff being the term applied to his descendants.

**Ashridge Park**, a park in Herts, England. Formerly an estate of the dukes of Bridgewater and earls of Brownlow. A portion, including Ivinghoe Beacon, has been acquired by the National Trust and another portion forms part of Whipsnade Zoological Gardens.

**Ashridge College**, originally the Bonar Law College, Berkhamsted, Hertfordshire, the Conservative centre for educating persons in economics, politics, social science, and in political hist., with special reference to the development of the Brit. Constitution and the growth and expansion of the Brit. Empire. It is now, without political affiliation, the A. College of Citizenship.

**Ashtabula**, a city of A. co., Ohio, U.S.A. It has an excellent harbour. Among its manufs. are leather, worsteds, and agric. implements. The name A. is an Indian word meaning fish-river. A great proportion of the pop. are of Finnish extraction. Pop. 21,000.

**Ashtaroth**, see ASTORETH.

**Ashtead**, a tn. in Surrey, England, 15 m. from London, on the S. railway. A Rom. villa was unearthed from its large common in 1925. Pop. 3300.

**Ashton-in-Makerfield**, an urb. dist. in Lancashire, England. There are large collieries, and iron goods are extensively manufactured. Pop. 20,500.

**Ashton-under-Lyne**, a manufacturing tn. in the Salford dist. of Lancashire, on the N. b. of the R. Tame. Dukinfield, a transpentine suburb, is in Cheshire. A. is 64 m. from Manchester; the chief industry is cotton, and there are many collieries in the dist.; hats, woollens, and silks are also manufactured in the neighbourhood. Pop. 52,000.

**Ashton, James Williamson**, first Baron Ashton (1842-1930). Eng. manufacturer and benefactor, son of James Williamson of Lancaster. Succeeded to a lucrative business his father had estab. in the manuf. of Amer. leather cloth and linoleum. He derived a great fortune from these factories, which were situated in Lancaster and elsewhere. His subscriptions to war loans were enormous, and he took stock to the value of £3,000,000 in the Thousand Million War Loan alone. Was a generous benefactor of his native town, Lancaster, and also gave largely to St. Anne's-on-Sea. Was high sheriff of Lancaster in 1885, and in 1886 represented the Lancaster div. in the House of Commons, a seat which he held until 1895, when he was created Baron A. of A. Later, he gave to Lancaster a new tn. hall and municipal buildings, besides maintaining the park which had been made from a bleak upland by his father.

**Ashton, John** (d. 1691), a Jacobite. He was for a time a servant of James II., and supported his master during his exile. He was found with treasonable documents, and was executed at Tyburn. He acted on the day of his death with considerable

fortitude, handing to the sheriff a paper which was afterwards pub. on the Continent to the consternation of the authorities.

**Ashurada**, a Russian naval station, on is. of same name in bay of Astrabad, Caspian Sea. It was acquired by Russia in the reign of Nicholas I., and was formerly of great importance. It is now secondary to Krasnovodsk.

**Ashwell, Lena** (Lady Simon) (b. 1872), Eng. actress, daughter of Commander Pocock, R.N. Studied at the Royal Academy of Music. First appearance in 1891 in *The Pharisee*. Managed successively the Savoy Theatre, and the Great Queen Street Theatre, which she reopened as the Kingsway Theatre.

**Asia**, the largest continent, occupies the N. portion of the E. hemisphere, extending beyond the Arctic circle and nearly reaching the equator. It contains about one-third of the whole of the dry land, and one-twelfth part of the whole surface of the globe. The philological origin of the name is unknown, though it seems probable that it was at first used with a restricted local application, gradually extended to the whole continent. Geographically speaking, Europe is a mere appendix to A., and exact delimitation in that sense is impossible, though the line of separation from Africa is better defined by the Red Sea. The N. boundary of A. is the Arctic Ocean, the extreme N. point being Cape Siyevostochny. The S. boundary it is impossible to fix with exactitude, but the volcanic chain of is., which can be traced through the Molucca and Sundra Is., may be taken as the limit. The S. coastline is much more irregular, and broken by the 3 great peninsulas of Arabia, Hindustan, and Cambodia. The Mediterranean and Black Seas form natural W. limits to the continent, as does the Red Sea lying between A. and Africa. The Ural R. and Mts. are the common conventional boundaries with Europe. N. of the Caspian, whilst the Manch depression is used as the limit of A. between the Black and the Caspian Seas, and the Bering Strait, 36 m. wide, separates A. from America. The peninsular area of the continent is one-sixth of the whole, a proportion surpassed only by Europe. Excluding this area, the continent resembles an enormous quadrilateral, of which the centre is 1600 m. from the sea. Whilst over a quarter of the area lies below 650 ft., 1.3 per cent being below sea-level, one-seventh is over 6600 ft. Four great divs. may be described in A.: (1) The N. Lowlands. (2) The Central Mt. System. (3) The E. Margin, including the is. (4) The S.W. Table-lands.

1. *The N. Lowlands*.—The lowlands of A. lie to the N. of a line from the sea of Okhotsk to the Caspian. They may be classified in 2 divs. The Turanian lowlands form the first div.; between them and W. Siberia, which forms the second div., is the Kirghiz steppe; the third div., that of E. Siberia, is of a more rugged nature. Turan (Russian Turkestan) is a low, sand-covered plain

forming the Aralo-Caspian depression. The Ust-Urt plateau, E. of the Caspian, and the Kirghiz steppe to the N. are the highest parts. Here the rivs. all evaporate or flow into lakes with no outlet. Thus the Ural flows into the Caspian, the Anu and Syr into the Aral, and the Ili into the Balkhash. W. Siberia is a flat, low-lying, and marshy region between the main stream of the Yenisei and the Ural Mts. The Tobol and the Lower Ob from the S., and the Irtysh and the Ob from the S.E., flow into the low-lying W. region. E. Siberia is a more lofty and uneven land; the Indigirka and the Kolyma drain the N. part, the Upper, Middle, and Lower Tunguska Rs. the W. part, flowing to the Yenisei. The Lena flows through the central regions. Various continuous mt. ranges, the Verkhoyansk, the Stanovoi, etc., running from the Lena delta to Cape Dezhnev, form the E. boundary.

2. *Central Mt. System.*—The central mass of mts. and plateaux widens gradually from the W. to the E. At 2 points in this mass the N. and S. lowlands approach each other more closely, in Armenia and in the Pamirs. Between these 2 points are 3 series of mt. chains, the N., the central, and the S. Between the N. and central chains there is a series of depressions, between the central and S. a series of plateaux. W. of Armenia the Caucasus and Yaila Mts. border the depression of the Black Sea, from which A. Minor on the S. is separated by the Pontic chain. There is in this region much evidence of recent volcanic disturbances. On the E. of Armenia the Elburz, Khorasan, and Hindu-Kush Mts. form the dividing line between the Turan depression and the Iran plateau. The N. ranges are not so clearly defined here, but may be traced in the W. spurs of the Tienshan Mts. The Iranian plateau, on the whole a deserted region, is bounded by narrow folded ridges and furrows, dominated by a massive chain of Cretaceous peaks. The Pamir plateau, bordered on the E. by the Sarikol and Muztaghata ranges, and on the N. by the Tienshan range, is much loftier. The ranges of the Tienshan run both W. and E. from the plateau, but the E. extension is far the more important, forming the boundary of Chinese Turkestan (Sinkiang). The Kunlun range, running due E. from the Pamirs, has on the N. Chinese Turkestan, and on the S. the Tibetan plateau. It extends for almost 2300 m., having the highest average level of any mt. chain in the world. The Tibetan plateau consists of a number of bare parallel ranges and troughs running from W. to E., with an average height of over 13,000 ft. Lofty mts., which are crossed by passes at an altitude of over 15,000 ft., form its boundaries. The Karakoram range, which has the greatest glaciers in the world, Biafo, Baltoro, and Hispar, runs S.E. from the Pamirs and forms the W. end of the platform. The S. end is formed by the Himalayas, with even loftier peaks, among them Mt. Everest, 29,000 ft., and pierced by the

gorges of the Indus, the Sutlej, the Ganges, and the Brahmaputra, among other rivs. These continuations of the folded mt. system form the main lines of S.E. A. The W. chain passes by the Khasi and Arakan ranges and the Andaman and Nicobar volcanic is. to the Malayan chain, also volcanic in character. It is separated from the central chain forming the Malay peninsula, by the Irawadi basin and the Andaman Sea. All these mts., from A. Minor to Malaysia, were folded in the Tertiary period, and are part of the younger mid-world mt. system. Their main feature lines are due to movements of the earth's crust, where only the superficial features have so far been affected by active denudation. The other mts. of Central A. are of a much older date; the valleys have been hollowed out of plateaux, characterised by ant. foldings of the rock layers. The land, however, is partly shaped by fractures, the deep rifts in which the waters of Lake Baikal have accumulated to a depth of over 4500 ft. being the most remarkable example. Similar rifts may be observed in E. Africa. Round Lake Baikal 4 great masses of the highlands can be specified. These are the Sayan and the Altai Mts. in the S.W., the W. Trans-Baikalian to the S.E. and E., and the plateau of Mongolia to the S. These highlands are much less lofty than the mt. systems of more recent origin. The loftiest of them, the Altai, N. of the Dzungaria plain, which connects the Siberian lowlands with the Mongolian plateau, have great glaciers in the upper valleys, and are heavily wooded on the wetter N. slopes. They contain many minerals, including gold. The Malkhan Mts. form the culminating line of the Trans-Baikal plateaux, but do not, as was formerly supposed, form the main divide between the Arctic and Pacific riv. basins. The Mongolian plateau, the average height of which is 3500 ft., is a stony sand-covered steppe, hence its native name of Shamo (sea of sand), or Gobi. The Khirgan Mts. form the E. limit of this region.

3. *The E. Margin of A.*—Along a great circle from Cape Dezhnev, beyond the tropic of Cancer, a series of scarps can be traced, composed of 2 arms, one of which is parallel to the meridian, the other to the lines of lat. This line is climatically and economically significant. In the coast line also, and in the peninsulas and is. of the extreme E., a somewhat similar succession of feature lines may be observed running alternately N. and S. and E. and W. Between these feature lines lie great depressions. In the W. there are Manchuria and the S. China and Tongking basins. In the E. they form the seas of Bering, Okhotsk, Japan, and E. China. The seas between the Philippines and the Marianne Is., and the Sulu, Celebes, and Molucca Seas lie to the extreme S. Three great rivs., the Amur, the Hwangho, and the Yangtse-kiang, rise in the plateaux of A. and break across these E. escarpments to the sea. The fringing is. are mainly volcanic;

the volcanic line forms a great arc through the Moluccas, joining the line already traced by the Andaman and Nicobar Is., Sumatra, Java, and the Lesser Sunda Is.

4. *S.W. Asiatic Table-lands*.—Geologically the Deccan and Arabia are a continuation of Africa, the former resembling S. Africa, the latter N. Africa. The Mesopotamian and Indo-Gangetic plains are formed of alluvium brought down by the rivs. Euphrates and Tigris to the former region, by the Indus, the Ganges, and the Brahmaputra to the latter. All these rivs. form great deltas.

*Climate*.—A. may be divided into 10 climatic regions: (1) The prov. of W. Siberia is very cold in winter and hot in summer. (2) E. Siberia is even colder in winter, and drier; it includes the pole of cold about Verkhoyansk, the coldest spot in the E. hemisphere. (3) The Kamchatka prov. has a moister and more genial climate. (4) China and Japan have a cold winter and monsoon rains in the summer. (5) The Central Asian plateau is exceedingly dry, with very cold winters, its height above sea-level enhancing the cold. (6) The Aral-Caspian plateau is a very dry region with a depressingly hot summer. (7) The Arabian region and Iraq have the same characteristics as the foregoing. (8) The Mediterranean region, including A. Minor, has the best climate, having no extremes of temp. (9) The lower Indus valley is dry and very hot. (10) India, the Indo-Chinese peninsula, and Australasia have a tropical climate, with abundant periodical rains, and a limited range of temp.

During the winter A. as a whole has a lower temp. than corresponding lats. elsewhere; but a higher corresponding temp. in July. The extreme cold of N.E. A. in the winter causes a high pressure of air, which flows S.S.E. and S.W. in January. Thus N.W., N., and N.E. winds prevail at that period in Manchuria, China, India, and S.E. Europe. In July S.W. and W. winds prevail on the W. coasts of India, S. and S.E. winds in S.E. A., and E.N.E., N.E., and E. winds in N.E. A. The rainfall of A. is very unequally distributed. The W. coast of India, the Indo-Chinese peninsula, and the valley of the Ganges receive more than 75 in. of rain per annum, whilst great tracts of the Ural-Caspian depression, Arabia, and Persia, have less than 10 in. annually. Central A. receives from 2 to 5 in. only; S. Siberia and Manchuria from 25 to 50 in.; and the remainder between 10 and 25 in.

*Flora and Fauna*.—The varying areas of vegetation naturally bear some correspondence to the climatic areas. The tundras, a name given to the immense stretches of boggy country whose vegetation is of an arctic character, are found N. of the Arctic circle, and as far S. as 60° N. The cold temperate forests of larch, spruce, fir, and birch lie between 50° and 60° N. The Mediterranean flora, comprising the vine, the fig, the orange, the citron, and the pomegranate in fruits,

and in trees the cedar, the cork, and the evergreen oak, flourishes in A. Minor and Syria. Pistachios and junipers grow in the less arid parts of the plateaux of Iran and Arabia, and date palms in the desert oases. The central steppe and desert, and the low-lying Turan, Tarim, and Gobi regions, large tracts of which are covered with salt wastes or moving sand dunes, have grasses and composites in some parts, willows and poplars along the courses of the streams, and in the loftier areas tamarisks, popples, ranunculi, and other small-leaved plants. The saksane is a characteristic shrub. The high mt. regions and chains are bare of trees. Meadows are, however, found in the N.E. parts of Tibet to a height of nearly 13,000 ft. Above this height are mostly deserts, with here and there a few saxifrages and pyrethra, whilst beyond the altitude of 14,500 ft. nothing is found but the everlasting snow. The valleys of the Pamirs have a scanty vegetation which extends to a much greater height, stunted trees having been found as far up as 23,000 ft. Deciduous forests cover the S.W. slopes of the Himalayas, whilst evergreens flourish on the S.E. The rich steppe land of the Amur region is distinguished by a vegetation which partakes of the nature both of that in the desert and that of the E. coast woodlands, and forms a transition region between the two. In Japan also 2 regions may be distinguished. The N. region has dense forests of deciduous trees, and thick undergrowth; the S. abounds in evergreen trees, such as camphor, laurels, etc. In the E. of the is. of the S.E. region the vegetation is more Australian in character, and eucalyptus trees predominate. The central mt. system separates very different floras. A mixed flora exists in Korea and Amuria, marking a transition between that of the Sino-Jap. region and that of the Siberian country. The flora of Arabia has many points of resemblance to that of N. Africa.

The fauna of A. is separated by the great mt. system into 2 main divs., the palaearctic and the oriental, with a transitional region in the E. Many fur-bearing animals are found in the N. forests, whilst the Arctic waters are the home of the seal, the walrus, and other aquatic mammals. The land animals of this region include the reindeer, the polar bear, the arctic fox, the ermine, the arctic vole, the lemming, the musk-ox, and the brown bear; a few Kamchatkan sheep are still found in the extreme E. Such birds as the ptarmigan, the snow owl, and the guillemot are found. A different fauna characterises the steppe lands to the S. of the forests. Such domestic animals as the horse, the ass, and the camel are kept, and the argali, a large species of sheep which lives in the mountainous regions. Amongst the other animals are the jerboa, the marmot, sev. species of deer and gazelles, and a few tigers. The lofty plateau of Tibet is a special region from a zoological point of view, and has sev. species which are found in no other quarter: the panda, the yak, the wild

ass, or kulan, a distinct kind of argali known as Hodgson's, from its discoverer, and some rodents. The Sino-Jap. region marks a transition in its fauna no less than its flora; many species of deer are found there, also monkeys and tigers. The sea otter is found round the coast; the giant salamander is peculiar to Japan. The pheasant and the silk-worm, which have been removed from their place of origin and bred with success elsewhere, originally came from China. There have been great changes in the fauna of A. since the glacial period, as observation of fossil remains has conclusively proved. Many species of animals have become extinct, amongst them the cave bear, the wolf, the hyæna, the mammoth, and the hairy rhinoceros. Other species are fast dying out, and will in a short time be extinct unless steps are taken to secure the prolongation of their existence, among them the bison.

*Ethnography.*—The peoples of A. may be divided into 6 different groups. The first is the Caucasian type, which is found in W. A., and in India. The second type, the Mongolian, inhabits Central and E. A. and the Indo-Chinese peninsula. The third, or Malay type, is found in Malacca and the Is. of the Indian Archipelago. The Dravidas, who form the fourth type, are found in S. E. India and in Ceylon. The Negritos and Papuas, who dwell in the virgin forests of the Philippines and the Celebes, form a fifth type. The sixth type, the Hyperboreans in N.E. A., are somewhat of a puzzle to ethnologists, and their affinities have not yet been traced. The first 3 types above-mentioned are numerically by far the most important, and form practically the whole pop., the numbers of the Dravidas, Negritos, and Hyperboreans being so small as to be negligible for statistical purposes. It may, then, be said that the Mongolian race forms seven-tenths of the pop., the Malay one-fifth, and the Caucasian a tenth part. Another div. of the whole pop. might be made on linguistic lines, 4 great branches may be observed, each with numerous sub-divs. The Ural-Altaians, or Finno-Tartars, form one group, which may be further subdivided into (a) Samoyedic tribes, (b) Finnish, (c) Turco-Tartars, (d) Mongols proper, (e) Manchurians and Tunguses. The next 2 groups belong to the same main category of polysyllabic peoples, the Jap. forming one, the Koreans the other. The other main group is composed of monosyllabic nations, subdivided into (a) Chinese, (b) Tibetans, (c) Himalayan tribes, (d) Siamese, (e) Burmese, (f) Annamese, (g) Sifars, etc. The use of the terms Asiatic and Oriental, as if they each denoted a clearly defined and homogeneous type, is somewhat misleading. The different Asiatic races differ very remarkably, and no underlying and unifying resemblance can be said to exist. They stand on a level between the natives of Africa and America and those of Europe. The point of mental resemblance which may

be observed in Asiatics, as opposed to Europeans, is the conviction of the unimportance of the individual. He is always considered as a member of some larger and more important body, such as the state or tribe, rather than as a separate and unfettered entity. The result of this mode of thought in politics is despotism, in religion a resigned determinism. It is chiefly due to this attitude that the hist. of A. has large and simple outlines.

*Hist. and Language.*—Few remains of prehistoric man have as yet been discovered in A., but a sufficient number of stone and bronze implements have been found in various parts of India to indicate the similarity in all regions of the first steps in civilisation of the human race. The little amount of knowledge which has been gathered concerning the earliest hist. of the Aryan race shows it as a pastoral people occupying the valleys and mts. along the course of the R. Oxus. The Semitic races, distributed from Syria to the Euphrates and Persia, and perhaps farther E., were their neighbours on the S. These 2 races in the course of time extended across S. Europe, N. Africa, and S.W. A. The Semites gave their language to Arabia, Syria, and N. Africa; whilst the Aryan speech gained prevalence over the greater part of Europe and the temperate zone of A., reaching from the Mediterranean to India. The intrusions of the Aryans into the Semitic regions are supposed to have been caused by pressure from Mongolian tribes on the N., and changes in climate. As an instance of such an intrusion, the invasion of Upper India by the Brahminical race may be cited. As the Aryan language developed into Sanskrit in India, so in Persia it gave birth to 'divine, high-piping Pehlevi,' or Zendic, the language of the sacred books of the fire-worshippers. In India the Aryans seem to have borrowed the Dravidian letters, as in Persia they adopted those of the anct. Assyrians. The Hellenic races, which were a European offshoot of the Aryans, also seem to have possessed no alphabet of their own, and have borrowed a Semitic one from the Phœnicians. Until about 250 B.C. the Bactrian Aryans used an archaic quasi-Phœnician alphabet; at that period the Pali letters, which form the basis of the Devanagari alphabet, are known to have been in use.

The races formerly occupying the plains of Iraq and the mts. adjacent, the Babylonians and Assyrians, are, with the sole exception of the Egyptians, those whose inscriptions and monuments supply the earliest definite records of mankind. These records go to show that powerful kings then ruled over those countries, and that frequent changes in the boundaries of the separate states took place—a state of affairs which lasted as long as the kingdoms themselves continued to exist. It is, of course, impossible to say with any exactitude how long these nations may have been in arriving at such a state of civilisation, but there is no reason



to suppose that the course of evolution was any more rapid than now. We can therefore surmise with certainty that long before 1500 B.C. the Babylonians and Assyrians had attained to a considerable amount of civilisation, but with the exception of these races no idea can be formed as to what was the condition of the continent before that date. The advance of the Chinese along the Hwang-ho, which synchronises with the entrance of the Aryans into Upper India, took place about then; both were striving against races belonging to a still earlier period of the world's hist. The O.T., the date of which is probably about 1600 B.C., forms the earliest distinct narrative we have of these times. From then for the next thousand years few details of Asiatic hist. are available; the kingdoms of Assyria, Babylonia, Media, and Persia were all in turn powerful. From 559 B.C. to 330 B.C., that is from Cyrus to Alexander, Persia was the dominant power in W. A. Previous to that, about 600 B.C., the kingdoms of Babylonia, Assyria, Media, and Persia began to coalesce, before being finally united under Cyrus, 'the great king,' whose empire is said to have extended from the Indus to the Mediterranean. The influence of Egypt and W. A., penetrating into Greece, caused the branch of the Aryan race which occupied that country to blossom forth into the most extraordinarily intellectual community which has ever existed. The Gks. were successful in resisting the advance of the Persian empire, and so in all probability prevented the spread of the W. Asiatics over Europe. That continent was thus left free to evolve the higher type of civilisation, in most respects, which is its characteristic. The downfall of the Persian empire was brought about by Alexander the Great about 330 B.C. After his expedition to India and his death, the Asiatic kingdom of Alexander fell to pieces, and numerous petty sovereigns sprang up in various parts of it. The Roms. for the first time took part in the struggle for A. about 50 B.C., when they took possession of Syria, and in a short time occupied a considerable portion of A. Minor, penetrating at length to the Tigris. The E. part of the old Persian kingdom, called Parthia by the Roms., had meanwhile become independent once more, and its monarch assumed the title of 'the great king,' and made an abortive effort to expel the Roms. from A. A lengthy contest between the Roms. and the Persian empire began in A.D. 226. The successes of Rome in the E. were celebrated in 274 by the famous triumph of the Emperor Aurelian, in which ambassadors from all parts of A., including China, are said to have appeared. The conflicts between the Persians and the Roms. continued for a long time after the div. of the Rom. empire, which took place in A.D. 395, but no material change in the boundaries of the combatants was effected. The Roms. or the Byzantines never advanced beyond Armenia or the Tigris, and

the Persians could never manage to retain a permanent foothold W. of those limits, though they reached Constantinople in A.D. 620. Chosroes I., who reigned from 531 to 579, was the greatest of the Sassanid kings, resisting successfully the Byzantine emperors, the Turks, and the Arabs. He extended his dominions from the Indus to the Mediterranean, and from the Jaxartes to Arabia and the borders of Egypt. Chosroes II., after being at first successful, was heavily defeated by the Byzantine emperor Heraclius at Nineveh in 627, and in the following year was murdered by his troops at Ctesiphon. This event was soon followed by the downfall of the Sassanid dynasty under Arab conquest. After a succession of victories the Arabs entered Susania and Persia proper. The last of the Sassanids, Yazdigerd III., made a supreme effort, and collected an army of 150,000 men, but was utterly beaten in 641 at the battle of Nahavend, and for more than 150 years Persia was a province of the caliphate. The followers of Mohammed continued their victorious career in Syria and Egypt, and the sixth of the caliphs was the most powerful sovereign in A. About A.D. 1000 Sultan Mahmud of Ghazni, a small tyr. in Kabul, conquered the Punjab; the dynasty of the Seljuk Tartars held sway in the eleventh and twelfth centuries from the Hellespont to Afghanistan. Genghis Khan, an independent Mongol chief, overcame Central A., conquered N. China, and overran Turkestan, Afghanistan, and Persia, whilst his successors overthrew the Seljuk dynasty, and conquered the caliphate. It was in the time of Kublai Khan, nephew of Genghis Khan, that the famous Venetian traveller, Marco Polo, whose *Travels* is so interesting and valuable, visited China, and gained the special favour of the Khan. Timur the Tartar, or Tamerlane, defeated and took prisoner Bajazet, descendant of Othman, the founder of the Ottoman empire, in 1402, at Angora, in Galatia. At the end of the fourteenth century all the old and medieval Persian empire became subject to Tamerlane. Tamerlane's career was but meteoric, however, and the Ottoman empire soon recovered; the Sultan Mohammed II. captured Constantinople, and overthrew the E. empire in 1453. China recovered her independence in 1368, but was again subjected by the Manchu Tartars from 1618 to 1645. After this it began to extend its empire over Central A. The discovery by the Portuguese in 1498 of the passage to India by the Cape of Good Hope marks a new epoch in European hist. in A. The Portuguese were the first to found colonies in India, but were soon followed by the Spaniards, Dutch, Fr., Danes, and Brit. The Mongol dynasty, however, was the chief power in India from early in the sixteenth century till late in the seventeenth. During this period the various European nations had been making some progress, and when the Mongol dynasty finally declined before Mahratta- and Afghan onslaughts the

long struggle for the rule of India among Asiatic races—pre-Aryan, Aryan, Afghan, and Mogul—was destined to end in European supremacy. In the conflict between the European races the Brit. after a struggle overcame their most formidable competitors, the Fr., and at length took possession of the whole of the peninsula with the exception of a few places on the sea coast. Russia, in the course of a few centuries, beginning with the conquest of Siberia by the Cossacks between 1580 and 1584, conquered and partly colonised the most favourable parts of the N.W. slope of the lofty plateau of A., and reached the Pacific across its narrow extremity in the N.E. France took possession of an extensive ter., in Farther India. China, before the Second World War, had sunk into a subordinate place, after having been regarded as the third power in A. The war with Japan in 1894-95 showed her weakness; the later war, 1931-33, accentuated it, while the subsequent invasion of China seemed to indicate that a large part of the coast and the N. part of China might be a permanent part of the Jap. empire. For by the twentieth century Japan had become the foremost Asiatic native power, having made great progress in industry during the last 70 years, and showing remarkable aptitude in assimilating the material civilisation, and to some extent the institutions, of Europe. By the early months of 1942 Japan, having entered the Second World War, had overrun Hong Kong, Brit. Malaya, Singapore, the Philippines, the Dutch E. Indies, and Burma. But by the autumn of 1945 Japan was driven into unconditional surrender (see PACIFIC CAMPAIGNS or FAR EASTERN FRONT IN SECOND WORLD WAR). Whether Japan's decisive defeat will be followed by a Chinese renaissance might seem to depend on the solution of the Chinese schism between the Kuomintang and the Communists. It is evident that one result of the Second World War has been the awakening of nationalism in S.E. Asiatic peoples, and always in a militant form—a political phenomenon which seems prejudicial to the continued paramountcy of the W. suzerains.

It is worthy of note that not only the great and most influential religions of the world—Buddhism, Christianity, Mohammedanism—but also those of secondary importance, such as Judaism, Parseeism, Taoism, have all had their origin in A. An unsystematic paganism represents the highest religious achievement of Europe, Gk. philosophy, though very advanced, not being a religion in the true sense of the word. On the other hand, Rom. Catholic Christianity retains but few Asiatic elements, though its origin and essential ideas are Asiatic. Christianity, thus made European, has made but little progress E. of A. Minor, nor has Buddhism made headway W. thereof, whilst Mohammedanism is repugnant to Europeans. It is indeed clear that the religious feeling and sentiment of A. and Europe are radically dissimilar. The mental

constitution of the Asiatic, too, is less easily changed than his institutions, which leads to speculation as to the ultimate effect of the far-reaching changes which have of late years taken place in A. The life of the people must indeed be changed thereby, but the question is whether the characteristics, the personality of the race, will be changed also. That question time alone can answer. See also ARABIA; CHINA; INDIA; MALAYA. See Marco Polo, *Kingdoms and Marvels of the East* (ed. H. Yule), 1903; H. Landsell, *Russian Central Asia*, 1885; A. Keith Johnston, *A Short Geography of Asia*, 1893; F. E. Younghusband, *The Heart of a Continent*, 1896; Sven Hedin, *Through Africa*, 1898; E. Svesst, *The Face of the Earth*, trans. 1904-9; J. C. Hannah, *Eastern Asia: a History*, 1911; P. T. Etherton, *Across the Roof of the World*, 1911; O. Hose, *Natural Man*, 1919; A. F. Whyte, *Asia in the Twentieth Century*, 1926; C. L. Woolley, *The Sumerians*, 1929; M. I. Rostovtzeff, *A History of the Ancient World* (vol. i, *The Orient and Greece*), 1930; G. N. Steiger, *A History of the Far East*, 1936; P. Morand, *The Road to India*, 1937; P. K. Hitti, *History of the Arabs*, 1937; H. H. Gowan, *Asia, a Short History*, 1938; W. M. McGovern, *The Early Empires of Central Asia*, 1939; R. A. Davies and A. J. Steiger, *Soviet Asia*, 1943; W. Mandel, *The Soviet Far East and Central Asia*, 1944; S. Cutting, *The Fire-Ox and Other Years*, 1947; D. Carruthers, *Beyond the Caspian*, 1948.

Asia Minor, Anatolia, or Anadolı, is the name applied to the portion of W. Asia which, projecting from the main mass of the continent, forms a W. peninsula of it. In shape the peninsula is oblong. The name Anatolia, first used in the tenth century, concerning only a part of A. M., was applied to the country under the Byzantine emperors and is retained under the form Anadolı by modern Turks. The boundaries of A. M. before the First World War were the Black Sea on the N., the Aegean Sea on the W., and the Mediterranean on the S. The boundary on the E. was arbitrary; for geographical purposes it could be taken to be a line starting from the gulf of Scanderoun, along the mt. ranges to a point on the Euphrates between Samosata and Malatıah, thence along the course of the Euphrates to near Erzingan, and then to the Black Sea, E. of Trabzon. In 1920, except for a small area around Chanak, on the Dardanelles, the whole of A. M., in spite of the defeat of Turkey in the First World War, had fallen under the rule of the *de facto* Gov. estab. at Angora with the style of the Gov. of the Grand National Assembly of Turkey. This gov. in 1923 became the Turkish Republic under the presidency of Kemal (see TURKEY), who had completely defeated the Gks. in A. M. (see later in this article), so that all the ter. previously conquered by the Gk. protagonists of dreams of Magna Græcia was again in the hands of the Turks. By the treaty of Lausanne 1923 (ratified by the allied

powers in 1924), Turkey was given the whole of A. M. comprised within the Caucasian frontier (as defined by the treaty of Kars, 1921), the N. part of the old Turco-Persian frontier, the Turco-Iraqi frontier, and the boundary between Turkey, and Syria from Jezira-ibn-Oman on the Tigris to a point S. of Payas on the gulf of Alexandretta. This delimitation excludes Batum and Mosul, but includes portions of the 3 sanjaks of Kars, Ardebil, and Artuin under the treaty concluded in 1921 with the Caucasian states. The peninsula consists for the most part of a tableland with an average height of about 2500 ft.; it is crossed by transverse ranges which run at right angles to the bordering mts., the Taurus range and the mts. round the Black Sea. The E. portions of the old Turkish empire are communicated with by passes through the Taurus and Anti-Taurus Mts. The plateau is here and there studded with the isolated cones of extinct volcanoes. The chief summits are the volcanic mt. Argish Dag, 12,650 ft., in the Anti-Taurus range; Bulgar Dag, 11,400 ft., in the Taurus range; and the famous Mt. Ida overlooking the classical plains of Troy. The surface of the plateau is for the most part arid, with large expanses of desert, though in the W. valleys the soil is very fertile. Even the largest rivers are too shallow for navigation save for short distances; among those running into the Black Sea may be mentioned the Yeshil, the Irmak, the Kizil, and the Sakaria. The Black Sea coast is rocky, but regular and unbroken; the W. coast is deeply indented, and is remarkable for the number of is. which are found off it; on the S. coast are the gulfs of Adalia and Alexandretta.

A. M. is very rich in minerals. Copper is found at Arghana, silver at Gumushkhane, Denek, and Akdag Maden, and lead at Berketlümaden, whilst iron ores, alum, nitre, and rock salt are also found. Mining, however, is carried on to a very small extent. The climate of A. M. has been noted in every age for excellence. The mts. are covered with forests of oak, ash, beech, and plane trees. The flora of the country is exceedingly beautiful; evergreens, myrtle bay, and holly flourish in great quantities. Agriculture on the whole is in a backward condition; the plateaux grow wheat, the lower valleys wheat and barley, the lowlands millet and rice. The is. of the archipelago produce honey, fruit, wine, and oil. Many of them are well known in classic hist., such as Patmos, Lemnos, Rhodes, etc. The wild animals still extant number among them the hyena, the lynx, the wolf, the bear, and the wild boar. Camels and asses are used as beasts of burden, whilst excellent breeds of horses, sheep, and goats are reared. The wool of the Angora goat, mohair, is very well known; bees are very largely kept. The prin. exports are raisins and figs from the W. valleys, cotton from the Adana and W. valleys, valonia, a forest product, opium, a product of the

tableland, barley, liquorice, wool, mohair, carpets, sponges, chrome ore, and meerschaum clay. The prin. seats of commerce are Smyrna, Trebizond, and Brusa.

**Communications.**—Whilst the number of good metalled roads is small, light carts can travel over almost every part of the plateau. The following are the chief railway lines: The Anatolian railway (840 m.) from Istanbul to Ankara and Konia; the Bagdad railway (q.v.), starting from Konia, which was, during the First World War, completed as far as Nisibin in Iraq. There are lines between Smyrna (or Izmir), Aidin, and Eghirdir (376 m.) controlled by an Eng. company; Smyrna, Cassaba, and Afium Kara Hisar (440 m.), under a Fr. company; Smyrna and Panderma, under a Fr. company; between Mudania and Brusa (26 m.); and between Samsun and Sivas. Other lines connect Cæsarea with Sivas; Ankara with Ereghli; Keller with Diarbekir; and Kutahia with Tavehaolo.

The pop. of A. M. is made up of sev. races, with the Turkish element predominant. Prior to the First World War, and the Graeco-Turkish war (1921-22), most of the trading classes were Gks. and Armenians, the remainder being, as now, mostly Jews, Arabs, and Kurds. After the First World War and the later war, large numbers of the Armenian pop. migrated to the republic of Erivan or were massacred. The Gk. pop. has almost ceased to exist in A. M., and the Moslem people of Turkey also suffered heavily from the wars. The present pop., according to the census of 1935, is 14,945,000. The chief vilayets (with pop. in thousands) are Izmir (Smyrna) (597), Konya (570), Ankara (534), Balikesir (431), Bursa (443), Sivas (433), Manisa (426), Malatya (410), Erzerum (385), Seyhan (Adana) (384), Trabzon (Trebizond) (361), Kastamonu (361), Kutahya (348), Samsun (338), Kocaeli (Izmit) (335), Zonguldak (322), Tokat (310), Kayseri (310), Kars (306), Afyon (300), Denizli (286), Coru (285), Gaziantep (284), Ordu (283), Coruh (Rize) (272), Yozgat (262), Aydin (261), Gireson (260), Flaziz (256), Bolu (248), Nigde (247), Jeel (Mersin) (244), Antalya (243), Mardin (230), Urfa (230), Cannak, kale (223), Diyarbekir (214), Mugla (197), Sinop (192), Maras (189), Ekişehir (183), Cankiri (178), Isparta (166), Gümüşane (163), Erzincan (157), Kirsheir (146), Mus (144), Van (143), Amasya (128), Aguri (Bayazit) (107), Burdur (96), Chief towns: Izmir (Smyrna) (171), Ankara (123), Seyhan (Adana) (76), Bursa (Brusa) (72), Konya (52).

The hist. of A. M. has a peculiar character owing to its unique geographical position. The bridge between Asia and Europe has, from very early ages, been the battleground of the E. and W. nations. Thus the hist. of the country is rather a chronicle of the march of armies and of the rise and fall of small disunited states, rather than the record of the progress of a single state under an independent

monarch. In the earliest period of which any knowledge can be gathered, A. M. was the home of various non-Aryan tribes who differed but little from each other. Much light has of late years been thrown on the civilisation of the Hittites or Syro-Cappadocians, the centre of whose power is supposed to have been Boghaz Keui. The date of the great Aryan immigration into A. M. from Europe is unknown, but it was declining in the eleventh and tenth centuries B.C. The kingdom of Lydia was the next to obtain supremacy, and following the fall of Lydia in 546 B.C., the Persians became rulers. In 334 B.C. Alexander the Great invaded A. M., but following his death the dynasty of Selencus was the most powerful in A. M., though it never held sway over the whole of the country. Then by degrees Rome conquered practically the whole of A. M., and was the dominant power when Christianity was introduced there. With the introduction of Christianity a great advance took place. The old religions and languages disappeared, and the people, with one language and one religion, began to have a united identity. In the sixth century A. M. was rich and prosperous. From the sixth to the tenth century Persian and Arab raids took place, and in the eleventh century the Seljuk Turks became the chief power. Then the Mongol power gained the ascendancy in the thirteenth century, and with the decline of the Mongol power the Osmanli Turks of Brusa gained the ascendancy from 1307. Tamerlane swept through the country in 1402, and though the Osmanli supremacy was finally re-established, it was after a lengthy contest. The defeat of the Emperor Romanus in 1071 marks the beginning of a new era for A. M. The prosperity and peace of the previous centuries came to an end then, and the country was for long years the prey of wandering tribes of nomads. These wandered through the country, caring nothing for any agric. or urban pursuits, and left the land bare behind them. The ravages caused by Timur in his raid were enormous, and the country has never recovered completely therefrom. The earliest Osmanli sultans enforced the Turkish language, and to a large extent the religion of Islam, on the conquered, and from that time the last traces of W. civilisation disappear in A. M. But, after many years of retrogression, the large Gk. increase—since the First World War somewhat discounted—in the W., the establishment of railways, and the spread of Ger. and Russian interests in the peninsula, all had their effect in turning the tide. After the First World War, the reforms of Mustapha Kemal accelerated this process.

*Hist. during and since the First World War.*—In the First World War there was heavy fighting in A. M. between the Turks and Russians in Armenia (see under ARMENIA). Pending the readjustment of Turkey's boundaries after the Armistice, a mixed Brk. and Gk. force occupied Smyrna. The geographical limits

of the ter. adjacent to Smyrna and the frontier of Turkey in Asia generally were laid down in the treaty of Sèvres (1920). Under the treaty Greece had accepted a mandate for the occupation and administration of the tn. and dist. of Smyrna. But the rise of the Nationalist movement in A. M. revived Turkish hopes of stultifying the treaty, which, though signed, was never ratified. A strong *de facto* Gov. came into power under Mustapha Kemal (see ATATÜRK), with its cap. at Ankara. The Gks., encouraged by the moral support of the Coalition Gov. in England, launched an offensive in A. M. in Mar. 1921. Defeated near Eskişehir, they withdrew towards Ushak in Apr.; they resumed the offensive from Ushak and Brusa in July, and in that month entered Eskişehir. The Turks fell back on the Sakharra R. to defend Ankara, and the Gks., rashly advancing on the cap., were heavily defeated in Sept., and taking up a new line at Eskişehir repulsed Turkish attacks at Afum Kara Hisar in Oct. In July 1922 the Turks opened a well-prepared offensive, and within 2 months the Gks. were in headlong flight, and by Sept. Kemal had recovered the mandated region. Smyrna was hastily evacuated, and the city consigned to flames by the victorious Turks, who massacred a large part of the Gk. pop. in A. M. The final territorial adjustment was made by the treaty of Lausanne (1923). Turkey in Asia now comprises the whole of A. M., and includes Cilicia, which was handed over to the Kemalists forces by the Fr. in 1922, and the sanjak of Alexandretta, ceded by the Fr. in 1939. The whole pop. of A. M. was considerably reduced by the exodus of Gks. and Armenians which ensued on the fall of Smyrna.

**Asiago**, an It. tn. in the prov. of Vicenza, capl. of the Sette Comuni, or Seven Coms. Pop. 3000.

**Asiago Plateau.** Some of the heaviest fighting on the It. front in the First World War took place on the A. P., notably in the anxious period of the Austro-Hungarian invasion of Italy in Oct. to Dec. 1917. The Austro-Ger. forces having taken Gen. Cadorna's headquarters at Udine on Oct. 30, being folled in the effort to force a crossing of the Lower Piave, tried to outflank the new It. lines, which, however, had been reinforced by Brit. and Fr. troops, by a direct assault on the A. plateau and mts. between the Brenta and Piave. Large bodies of Austro-Ger. troops were flung in vain against the mt. masses, but, though the Its. gave up some of the ground, the effort to reach the Venetian plains failed. In the following Dec. the Austro-Ger. forces made a further and desperate attack on the plateau and the upper reaches of the Brenta. Monte Asolone and the summits of Monte Tomba fell to them; but both, together with the Piave bridgehead at Zenon, were retaken by the Its. in Jan. 1918, and their positions on the plateau consolidated. The net effect of the It. setback on the Piave was salutary in that it knitted

It. people together in a firm and patriotic resolve to reform their army and purge their country of treasonable elements.

**Asiatic Quarterly**, a review, the full title of which, in 1891, became *The Imperial and Asiatic Quarterly Review and Oriental and Colonial Record*, being then and for some years afterwards pub. by the Colonial Institute at Woking. It was founded in 1886 to deal with questions of Indian and general oriental interest, and, in 1891, its scope was extended to include African and colonial subjects. Its present-day representative is the *Asiatic Review*, which does not embrace African subjects.

**Asiatic Society, The Royal**, 74 Grosvenor Street, London, W. 1. An institution formed for the furtherance of Indian and oriental studies. Monthly meetings are held every year from Oct. to June inclusive, and at these gatherings papers on recent research and discoveries, and on cognate subjects, are read by highly qualified and travelled authorities. The A. S. also issues learned publications on oriental subjects.

**Asiatic Turkey**, see ASIA MINOR; TURKEY.

**Asiaticus**, see ANTIOCHUS.

**Asiento**, see ASKEPYTO.

**Asinius**, see POLLIO, GAIVS ASINIUS.

**Asir** (i.e. the inaccessible). A region in Arabia belonging to the kingdom of Saudi Arabia; it extends from a line drawn inland from Birk on the S. border of the Hejaz to the N. border of the Yemen, some 10 m. or more N. of the port of Midi. In breadth it extends from about 180 m. E. to Beni Yam in the S. Arabian geographers include it within the Yemen, but since the war between Ibn Sa'ud, king of Saudi Arabia, and Yahia, Imam of the Yemen, there have been political changes in this region. Included in the ter. are also the Farsan ls., which were believed to contain oil deposits. The maritime lowland has many fertile areas near the wadis, which are suitable for some cereals and afford pasture. The chief tns. are Abha (A. Surat) and Jizan (A. Tihama).

**Asirgarh**, a fortress in the Central Provs. of India. It is situated 300 m. N.E. of Bombay. Its position on an isolated mt. of the Satpuras gives it natural advantages for fortification. It was captured by the Brit. twice.

**Askabad**, or **Askhabad**, see POLTORATSK.

**Askari** (Arab. *askar* army). Term used for native soldiers in Africa when trained and officered by Europeans.

**Aske, Robert** (d. 1537), an Eng. rebel, leader of the Pilgrimage of Grace. He was hanged in chains at York as punishment for complicity in treason. A promise to give up the cause was of no avail.

**Askeaton**, a small Irish tn. in the co. of Limerick. Pop. about 800.

**Askier**, see NEWT.

**Askern**, a vil. of the W. Riding of Yorkshire, 8 m. N. of Doncaster. Centre of a mining dist.

**Askew, Anne** (1521-46), an Eng. martyr to Protestantism, b. at Stollingsborough.

The vigour with which she upheld her own faith caused her torture and subsequent death by burning at Smithfield.

**Askew, Anthony** (1722-72), a native of Westmorland. Intended for the medical profession and commenced practice at Cambridge in 1750; but it is as a classical scholar that he is better known than as a doctor. He helped to develop the taste for curious MSS., scarce eds., and fine copies, and laid the foundations of an extensive library, the Bibliotheca Askewiana. His MS. vol. of transcribed inscriptions is in the Brit. Museum.

**Askja**, a volcano of Iceland. It possesses a huge crater measuring 17 m. in circumference, and rises from a bed of lava called Odátharaun. It is the largest volcano in the is. It throws forth volumes of steam incessantly, and by many eruptions has built up a mt. 4633 ft. high.

**Askwith, Sir George Ranken, Baron** (1861-1942). Eng. lawyer, son of Gen. William Harrison A. Educated at Marlborough and at Brasenose College, Oxford. Called to the Bar in 1886. Held junior brief for the Brit. Gov. in the Venezuela arbitration, and, through the influence of Lord James of Hereford, he was appointed counsel to H.M. Commissioners of Works, and for the Crown in peerage claims. He will be remembered for his success as an arbitrator in labour disputes, having received a good training under Lord James. His conciliatory policy settled many strikes and lock-outs, notably the cotton dispute of 1910 and the transport workers' strike of 1911. During the First World War he was chairman of the Gov. arbitration committee under the Munitions Acts. In 1931 he was chairman of the Malta royal commission (see MALTA). Pub. *Industrial Problems and Disputes*, 1920; *British Taverns, their History and Laws*, 1928; *Lord James of Hereford*, 1930.

**Asmara**, a tn. of Abyssinia, Africa, about 50 m. S.W. of Massowah. It was the seat of governmental residence of the former It. colony of Eritrea. It was captured by allied troops on Apr. 1, 1941. It is a modern tn., 75 m. by rail from Massowah, with new motor roads to Hassoowa, Agordat, and Cheren (Keren). Pop. (1939), 85,000 (of whom 50,000 were It.).

**Asmodeus**, an evil genius of Heb. tradition, sometimes associated with Beelzebub or Apollyon. He is mentioned in connection with Solomon in the Talmud. He has often been termed the spirit of matrimonial jealousy, from a chronicle in the apocryphal book of Tobit. Here he slays the 7 successive husbands of the beautiful Sara, daughter of Raguel, because of his own love for her. In *Le Diable boiteux* Le Sage makes him the chief character.

**Asmoneans**, the original name of the Maccabees, a family of heroes who delivered Judaea from the oppression of Antiochus Epiphanes, king of Syria (175-164 B.C.). Their hist. is to be found in the books of the Maccabees, the last 2 books of the Apocrypha.

**Asnières**, French tn. in dept. of Seine

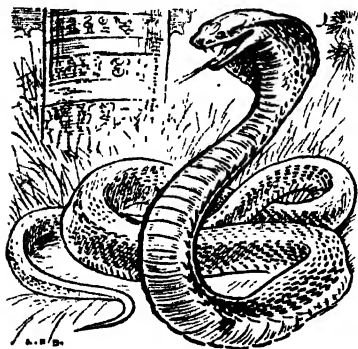
near St. Denis. Great boating centre for Parisians. Manufs. bicycles, perfumery, and pianos. Pop. 52,000.

**Asnyk**, Adam (1838-97), Polish poet and dramatist, b. at Kallisch. He studied medicine and philosophy at the univ. of Warsaw, Breslau, and Heidelberg, graduating as a doctor in 1866. His chief dramatic writings are: *Cola Rienzi* (1869), a tragedy; *Kiejstut* (1878); *Przyjacieł Hioba*, i.e. The Friends of Job (1879).

**Asoca**, or *Jonesia asoca*, a tropical plant of the order Leguminosæ often mentioned in Indian mythology.

**Asoka**, emperor of India, grandson of Chandragupta, the conqueror of Seleucus. He reigned from 264 to 230 B.C. over ter. roughly corresponding in area to Brit. India excepting Burma. He was a disciple of Buddha and organised Buddhism as a State religion. There is evidence of his proselytising zeal in rock inscriptions in various dists. of N. India. Consult Allan Menzies, *The Religions of India*.

**Asolo**, an anct. city of Venetia. Its situation on the hills enables it to boast a magnificent view over the plains to Venice. Its anct. walls and turreted buildings give it a picturesque appearance. In his *Asolando* Browning celebrates the place, and it possesses associations in connection with Caterina Cornaro, queen of Cyprus, and also memories of Canova. Pop. 6000.



ASP

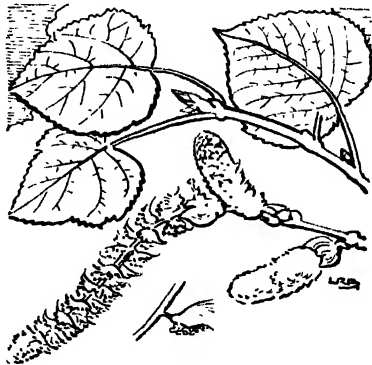
**Asp**, an ophidian reptile closely related to the Brit. adder properly termed *Vipera aspis*, of the family Viperidæ; it is found in S. Europe. The term is also loosely applied to other snakes, as the *Naja haje*, the spy-slang of Africa, of the family Colubridæ. Cleopatra's asp was probably *Cerastes cornutus* or horned viper, of the family Viperidæ, found in Arabia, N. Africa, and Syria.

**Aspalathos**, or *Splato*. See SPLT.

**Asparagus**, a genus of Liliacæ, growing in Asia and S. Europe. The young shoots of *A. officinalis* form a succulent vegetable, frequently forced in Britain and Russia.

**Asparagus Stone** is a variety of apatite (q.v.), a mineral which is formed chiefly of phosphate of lime.

**Aspasia**, a courtesan of Athens of the fifth century. In 445 Pericles, after divorcing his wife, made her his mistress, and later was able by his influence to legitimise a son he had by her. She is



ASPEN

believed to have had considerable influence over him, and by some authorities the Samian and Peloponnesian wars are attributed to her. On the death of Pericles she became the mistress of Lycicles, who d. a year after Pericles in 428. There is a bust of her in the Vatican.

**Aspasius**, a Gk. Peripatetic philosopher who commented on Aristotle at great length. Later writers refer frequently to his remarks upon the *Categories*, *De Interpretatione*, and *De Sensu*, but the works themselves are lost, as also are commentaries upon Plato. However, copies of the commentaries on parts of the *Nicomachean Ethics* are extant. He fl. c. A.D. 80.

**Aspatria**, a coal-mining tn. in Cumberland, England, 20 m. from Carlisle by rail. Pop. 3300.

**Aspe**, a tn. in the prov. of Alicante, Spain, and situated 21 m. W. of the tn. of Alicante. It has a trade in ore and wine. Pop. 8000.

**Aspect**, in astronomy, a position of the planets in certain relative distances. During the vogue of astrology there were 5: conjunction, sextile, quartile, trine, and opposition. Conjunction is applied when 2 planets are in the same lat.; when they are 60° apart they are sextile, 90° quartile, 120° trine, and at 180° (necessarily opposite) in opposition. The only 2 terms surviving are conjunction and opposition.

**Aspen**, a species of Salicacæ grows in colder countries. It belongs to the genus *Populus* (q.v.), and its scientific name is *P. tremula*.

**Aspen**, co. seat of Pitkin co., Colorado, U.S.A., in Roaring Fork Valley. Silver mines in the vicinity. Pop. 2000.

**Asper** is the name of a Turkish money of account. The name means white, and is probably derived from the whiteness of newly coined silver. The A. was a silver coin of very small value, 120 being required to equal in value a piastre.

**Asper, Hans** (1499-1571), a Swiss natural hist. and portrait painter, b. at Zürich; a contemporary of Holbein, and influenced by him in his work.

**Asperges**, the ceremony of sprinkling people with holy water before mass. It is observed in the Rom. Catholic Church, and derives its name from the first word of the invocation *Asperges me, Domine*, etc. The vessel used to hold the water is an aspersorium, while the anointing brush is called an aspergil. The sprinkling of the water itself is called an aspersion.

**Aspergillum**, a genus of molluscs of the family Clavagellidae and order Eulamelli-branchiata. *A. javanum*, the watering-pot shell, is so called from its shape, the bivalve shell occurring at the end of a perforated shelly tube.

**Aspergillus**, a minute fungus of order Pyrenomycetes and family Perisporiaceae; it belongs to the div. Ascomycetes. This fungus, *Eurotium A.*, is the mould often seen on jam exposed to the air.

**Aspern**, a small vil. of Austria, on the Danube near Vienna. In 1809 a desperate and bloody affray occurred there between Napoleon and the Archduke Charles, resulting in a defeat of the Fr. The loss of life amounted to 54,000.

**Aspertini, Amico** (1475-1532), a Bolognese painter, was b. at Bologna. He was a pupil of Francesco Francia, and imitated the painters of different periods, though this did not prevent his criticising very harshly the imitators of Raphael. He excelled at painting frescoes, and decorated a large number of buildings, but his character was more original than his talent, for he painted with both hands at once. He also tried sculpture and engraving, but without any success.

**Asperula**, a widespread genus of Rubiaceae. There are 2 Brit. species, *A. odorata*, the woodruff, and *A. cynanchica*, the squinancy-wort.

**Asphalt**, a naturally occurring form of bitumen. It consists of a mixture of hydro-carbons, the elements carbon, hydrogen, oxygen, nitrogen, and sulphur being present. The manner in which the deposits are produced is a matter of some doubt, but they are probably formed by the oxidation and evaporation of liquid petroleum which has found its way from surrounding outcrops of petroleum-bearing strata. The best known deposit is the 'Pitch Lake,' at La Brea, in the S.W. corner of the is. of Trinidad, which covers an area of about 100 ac. It was known from a very early period, for the buccaneers caulked their ships with the material, and is now worked by the New Trinidad Asphalt Company, who export about 100,000 tons annually. Other deposits of A., somewhat different in composition, are found in Venezuela, Cuba, the Dead Sea, and Switzerland. That found at Val de Travers in Switzer-

land is really a bituminous limestone, and is largely used for preparing A. camite, which contains a great proportion of limestone, and is much in demand in the form of blocks for street paving and floors. A. is also used for damp-courses in the walls of houses, for preparing waterproof flooring and roofing, and as an ingredient in Japan varnish. An artificial A. is made from coal-tar pitch, and for some purposes is an efficient substitute for the naturally-occurring substance.

**Asphalter's Work** (in building, *q.v.*), courses of asphalt, at least  $\frac{1}{2}$  in. thick, are laid on brick or masonry walls just above the ground level, to prevent the damp from rising; underneath buildings to exclude ground air; on flat roofs, etc.

**Asphaltites Lacus**, see DEAD SEA.

**Asphodel**, a genus of Liliaceae which grows in S. Europe. *A. albus*, the white asphodel, is found near the Mediterranean; *A. luteus*, the yellow asphodel, has red berries, and is found wild in Sicily, Dalmatia, the Peloponnesus, and the Crimea.

**Asphyxia** (Gk., pulselessness), the suspension of vital phenomena due to absence of the requisite proportion of oxygen in the lungs. The condition may be brought about by any obstruction to the passage of air to and from the lung, as in drowning, constriction of the windpipe, or the presence of foreign bodies or morbid growths in the air passages; or an insufficient supply of oxygen in the atmosphere breathed; or any interference with the muscular actions which produce breathing, such as may be occasioned by paralysis or great pressure on the walls of the chest and abdomen. In the lungs a continual exchange of gases goes on, oxygen being absorbed and carried to the tissues by the blood, and carbon dioxide being formed by the decomposition of carbonates in the blood. The proportion of carbon dioxide in the air of the lungs remains fairly constant, and this proportion can only be maintained by the inspiration of air rich in oxygen and the expiration of air with a relatively large proportion of carbon dioxide. If there is need for a larger consumption of oxygen, as during muscular exertion, the breathing becomes quicker and deeper; and it is also found that excess of carbon dioxide tends to stimulate the breathing, so that the actual proportions of the gases in the air of the lungs do not alter although the outer air be vitiated. If, however, the supply of air is so restricted or vitiated that the proportion of carbon dioxide within the lung increases, symptoms such as headache and nausea immediately present themselves, the skin takes on a blue tinge, and as the percentage increases consciousness is lost, respiration ceases altogether, and finally the heart stops beating.

The treatment in case of A. consists of first removing the cause and then resorting to artificial respiration. If the cause be inhalation of bad air, the patient must be at once removed to the open air, and the clothing about the neck, chest, and waist loosened. When choking is

threatened through the presence of a foreign body in the air passages, an effort should immediately be made to dislodge it by means of the fingers, as there is risk of sudden A. An attack of vomiting or coughing may also succeed in ejecting the obstacle; or if a surgeon be at hand and the urgency of the symptoms demand it, laryngotomy or tracheotomy, according to the position of the obstacle, may allow air to pass to the lungs.

**Asphyxiants** are chemical substances which have a poisonous effect on the humar system, producing suffocation. Many of them are used in the manuf. of ammunition.

**Aspie** is the name given to the transparent, light-coloured jelly in which fish, meat, etc., are sometimes served.

**Aspidistra** is a small genus of Asiatic Liliaceæ. It has broad leaves, and the species *A. elatior* is often cultivated in Britain as a hot-house plant.

**Aspidium**, the shield-fern, is a genus of ferns of the order Polypodiaceæ. *A. filix-mas*, or *Nephrodium filix-mas*, the male fern, grows in woods and has antiseptic properties; *A. filix-femina* is the lady-fern; *A. lonchitis* the holly-fern; *A. aculeatum* the prickly shield-fern.

**Aspidura**, a fossil genus of echinoderms of the order Ophiureæ. These brittle-stars, related to star-fishes, are found in Ger. Muschelkalk.

**Aspinwall**, see COLON.

**Aspinwall, William H.** (1807-75), Amer. railway builder, b. in New York; in 1837 a partner in the shipping firm of Howland & A. In 1850 he left this to construct the Panama railway across the Isthmus. It was completed in 1855, and the E. terminus was named after him. He was one of the founders of the Pacific Mail Steamship Company.

**Aspirate** (Lat. *spiro*, I breathe). It denotes a sharply defined audible breath, and as such signifies in Eng. grammar the letter *h*. In Gk. the *spiritus asper*, or rough breathing mark, when placed over an initial vowel has the effect of prefixing an *h* in the reading or pronouncing of the word. Besides its significance in Eng. it is also used in application to 2 classes of consonants, i.e. those blended with *h*, as in the Sanskrit, and those followed by *h* in Eng. in examples like *th* and *ch* with *f* and *v*. Thus, in the latter and broader sense of the term, 8 of the 16 Eng. mute sounds are *tene*, i.e. possessing their corresponding aspirate.

**Aspirator**, an apparatus used for drawing air or other gases through vessels connected with it. The simplest form consists of a large bottle filled with water, and supplied with a stop-cock at the bottom. The apparatus through which the gas is to be drawn is connected with the neck of the bottle and the stop-cock is opened. As the water flows out of the bottle, air or gas flows in to take its place through the only available channel, that is, through the apparatus connected with the A.

Another form of A. consists of a narrow tube connected with a supply of water

under pressure. This jet is surrounded by another tube closed at the top and connected laterally with the vessel from which the air is to be withdrawn. Air is carried down with the jet so that a continuous current is set up from the vessel to be exhausted.

**Aspirin**. The trade name for acetylsalicylic acid, formula  $C_9H_7O_4$ . It is also known as acidum and acetosalicum or salacetin, and is made through the action of acetic anhydride on salicylic acid. Though first introduced into medicine under the name of A., other trade names are Genasprin and Aspro, and there are many others. The dose is from 5 to 15 grains, and it is prescribed for rheumatic fever to reduce temp., and it is a widely used remedy for neuralgia and headaches. It has the same action as salicylic acid, but is not so prone to producing such secondary effects as gastric disturbance. Care is to be taken to avoid exposure after administration, as perspiration often follows the dose.

**Aspland, Robert** (1782-1845), Unitarian divine. He was originally intended for the Baptist ministry, but was expelled from that body in 1800 for 'unsoundness,' and entered business, doing 'supply' preaching on Sundays. In 1801 he became minister to the General Baptist church at Newport, Isle of Wight; in 1805 he went to Norton, Derbyshire, and later in that year began his 40 years' ministry at the Gravel Pit Chapel, Hackney. He estab. sev. Unitarian periodicals, was secretary to numerous denominational societies, and in 1813 founded the Hackney Academy at Durham House for the training of Unitarian preachers. See *Memoirs* by R. Brook A. 1850.

**Asplenium**, a genus of ferns of the order Polypodiaceæ, commonly known as spleenworts, and having medicinal properties. *A. trichomanes* is the common spleenwort; *A. adiantum-nigrum* the black spleenwort; *A. ruta-muraria*, the wall spleenwort or wall rue, grows on rocks and old walls. *A. bulbiferum* is curious on account of the young plants which grow on its leaves; *A. rhizophyllum*, the walking fern, roots at its leaf-tips when bent to the ground; *A. nidus*, the bird's-nest fern, is a beautiful tropical plant.

**Aspredo**, the name of a genus of fish belonging to the family of the Silurides, inhabiting the waters of S. America.

**Aspromonte**, a mt. of Calabria, Italy. It is situated at the W. extremity of the range of the Sila Mts. and rises just behind the peak of Reggjo di Calabria. Its slopes are forest-clad, and its height 6420 ft. It was the scene of Garibaldi's arrest in 1862.

**Aspropotamos**, see ACHELOUS.

**Asquith, Herbert Henry**, see OXFORD AND ASQUITH, EARL OF.

**Asquith, Lady**, see OXFORD AND ASQUITH, COUNTESS OF.

**Ass**, a general name for the genus *Assus* of the horse tribe. It differs somewhat from the horse in having a tuft of hair at the end of its tail, in having no warts on its hind legs, and in the



presence of stripes, which are absent in the domestic A. Its characteristics are long ears and an upright mane, together with a proverbial stupidity. The Egyptians used the head of an A. to signify the sign of extreme dullness. It is only fair to add on behalf of the A. that this celebrated stupidity is more superstitious than actual. Although the domestication of the A. took place at a very early date, the common 'donkey' was not introduced into England till the time of Elizabeth. The animal is particularly adapted for transport purposes on account of its surprising hardihood, endurance, and docility when treated kindly. The usually wretched specimens seen in England are more the result of bad treatment than naturally so. In Arabia, Syria, and Egypt, among other places, its careful treatment has resulted in the evolution of an animal of remarkable value, for a Sp. be-ass was worth £200 in 1939. The wild variety is much hunted in Persia, and its flesh, greatly prized. Because of the presence of more sugar and less cheese in its milk, invalids take it with benefit. Its skin is manufactured into shagreen leather, and also used in the making of drums. The variety called albino, i.e. white, was used by the ancients on state occasions and reserved for the highly honoured.

**Assab Bay**, situated on the W. coast of the Red Sea. Formerly an It. trading station; in 1880 it was taken over by an It. Gov. from a private company and used as a coaling station. There is a good harbour and a lighthouse.

**Assahan**, the name of an inland vil. of Sumatra, situated on a riv. of the same name. It is situated in 3° 1' N. lat. and 99° E. long., and is a Portuguese settlement, whose prin. product is malacca.

**Assai**, a beverage much in favour with Brazilians. It is made by soaking in water the fruit of the *Euterpe edulis*, or A. palm. The concoction is said to be very nutritious.

**Assaki, Georg** (1788-1869), a Moldavian poet and historian, was b. and d. at Jassy. He represented the Gov. at the Viennese court, and helped in the production of the statute which reorganised the state of Moldavia. He wrote plays and poems, and a hist. of Russia, and is regarded as one of the fathers of modern Rumanian literature.

**Assal**, an extensive salt lake of Fr. Somaliland. It is nearly 600 ft. below sea-level. Caravans call there to gather the salt that thickly encrusts its shores.

**Assam** is a prov. of the dominion of India, in the extreme N.E., E. of Bengal. The Brahmaputra valley in A. has in a large measure had a separate hist. from the remainder of India. The reason of this is the narrowness of the valley and the peculiarities of its situation. The valley is more than 400 m. long, and for most of its length less than 50 m. wide, though near its mouth it reaches a width of 100 m. Of this scant breadth the Brahmaputra, with the thick, impenetrable jungle on its banks, occupies from 6 to 20 m. The inhab., thus restricted

to a small area, were exposed to incursions from hill tribes and other invaders; this had the effect of keeping down the pop. The Ahams, the inhab. who gave the name to this valley, which was afterwards extended to the whole prov., entered the dist. from the E. in about the thirteenth century. They were, however, engaged in incessant warfare with the Muslims in the W., whose aim was to annex the prov. to Bengal. The valley was conquered by the Brit. in 1826. A. was constituted an autonomous prov. in 1937, with a legislature of 2 Chambers. For the purposes of administration there are 2 divisional commissionerships. During the period of Brit. rule the prosperity and pop. alike increased rapidly. This was largely due to the tea plantations, which were inaugurated in N. A. in 1835. These plantations, worked by coolies from the crowded dists. of W. Bengal, are strictly supervised by Gov. The flora of the prov. is tropical in character, the mts. and hills being covered by dense forests of evergreens. The prin. forest product is rubber, and the lacquer tree of Japan is also cultivated. A good steam coal is worked in the coalfield at Makum; the other minerals include iron ore and limestone, of which there are immense beds in the S. Petroleum is also found. The seat of administration of the governor for the prov. is Shillong. Area 49,473 sq. m., pop. 7,038,000. The dist. of Sylhet, by the Indian Independence Act of 1947, was detached from A. and joined to E. Bengal (Pakistan).

Manipur state, with an area of 8600 sq. m. (pop. 446,000), and the Khasi states, with an area of 3700 sq. m. (pop. 180,000), are under the political control of the governor of A. A. was the theatre of a threatening Jap. invasion early in 1944, when the Tiddim area, Kohima, and the Imphal plain became the chief centres of fighting. The battle round Imphal was fought out between the 4th Army Corps under Lt.-Gen. Geoffrey Scoones, reinforced by brigades of the 5th Indian Div., and the 15th and 33rd Jap. Divs., reinforced by 2 other Jap. and 1 Indian National Army Div. Kohima was relieved after bitter fighting during which the Brit. 2nd Div. and 2 brigades of the 7th Indian Div. stormed the Kohima Hills and defeated and destroyed the 31st Jap. Div. There was no pause after the defeat of the Jap. at Kohima and Imphal; the pursuit was kept up through the worst of the monsoon rains, and the remnants of the Jap. 31st and 15th Divs. were driven back across the Chindwin by the 33rd Corps. For details of this campaign in Manipur see BURMA, SECOND WORLD WAR, CAMPAIGNS IN. See Sir E. Galt, *A History of Assam*, 1926; F. M. Bailey, *China-Tibet-Assam: A Journey, 1911*, 1945.

**Assandun**, see ASMINGTON.

**Assary**, the Rom. copper coin called as.

**Assas**, Louis, Chevalier d', was b. at

Vigan in 1733. Sprung from an old though not aristocratic family, he entered the army while young, and reached the rank of captain in the regiment of Auvergne. The legend runs that, on the night of Oct. 15, 1760, he entered a wood to reconnoitre, and was immediately surrounded by the enemy, who warned him that if he spoke a word he would be killed immediately. Thereupon he uttered his famous cry, still quoted frequently, 'A moi, Auvergne, ce sont les ennemis!' The truth of this story had been much disputed of late years, some asserting that the incident in question never happened, others ascribing the honour of it to Sgt. Dubois. It is remarkable that biographies give but inexact and incomplete information concerning this personage, whose name occupies so striking a place in the national hist. of France.

**Assassin**, a term applied to one who murders another by surprise or by some secret means or treachery. The word is derived from *hashish*, the opiate made from the juice of hemp leaves. It was originally the name for a sect of the Shiites, known otherwise as Ismailites, founded by one Hassan Sabbah in the eleventh century. Till the thirteenth century the sect was in a flourishing state, when the Mogols under Hulagu destroyed its power. During his youth Hassan studied under a doctor at Nishapur, where he met the grand vizier of Malik-Shah. Later he endeavoured to usurp the vizier's place in the court, but failed, and was compelled to leave Persia. In 1078 he went to Egypt, where his great abilities earned him a welcome at Cairo. Here, too, his efforts towards the advancement of his own interests caused his withdrawal from that country. At Kuhistan, after varied experiences, he founded the Ismailite sect. He captured by a ruse the fortress of Alamut in Persia and settled there as chief of the society afterwards called the As. The doctrines of the As. were those of the Ismailites, with the additional custom of the secret removal of all its enemies. At the head was the Sheikh al Jabel, who was assisted by 3 grand priors. Beneath these were the semi-initiated members, and last the actual agents of assassination, who were called *fedais*, meaning devoted ones. They worked in absolute ignorance of the objects and rites of the society, and from them was exacted the most implicit obedience. The chief used occasionally to allow them every sensual indulgence, having previously drugged them with hashish. In return for such experiences they were ready to obey his slightest wish, valuing their lives as nothing. One of the first victims was Hassan's former friend, Nizam-al-Mulk, followed shortly by the murder of the Shah Malik. Shah Malik's successor made war against the As., but to no purpose. It is said that no precautionary measures ever seemed to avail against the machinations of the society. In N. Syria fragments are still believed to exist of the society. In 1255 a massacre of 12,000 of the As. by order

of the Tartar khan, and a subsequent ravaging of their country by Bibars, the Mameluke sultan of Egypt, completely destroyed their power.

The application of the word assassination is now generally limited to the taking of the life of a public personage for the motive purely of destroying his life. By the ancients it was sometimes applauded. During the sixteenth and seventeenth centuries political assassination became prominent. During the reign of Elizabeth many desperate attempts were made to assassinate her. At this time political enthusiasts resorted to the most extreme methods of gaining their ends, and assassination, the very height of violence, was frequently and successfully perpetrated by these fanatics. Among the most famous victims of assassination were Julius Caesar, 44 B.C.; Thomas à Becket, A.D. 1170; David Rizzio, 1566; Lord Darnley, 1567; William of Orange, 1584; Wallenstein, 1634; Marat, 1793; Paul, tsar of Russia, 1801. Three presidents of the U.S.A. have been assassinated: Abraham Lincoln in 1865, James A. Garfield in 1881, and William McKinley in 1901. Ex-President Roosevelt, while campaigning for the Presidency again on the Bullmoose ticket, was shot in 1912, but escaped serious injury. An assassination plot in 1696 was organised for the contemplated murder of William III. by the Jacobites. It was their intention to kill the king on his return from a hunting expedition. One of the plotters communicated with the king, the hunt was postponed, and many arrests were made. Other assassinations were those of Carnot, Fr. president, 1894; Humbert I., king of Italy, 1900; Carlos I., king of Portugal, and his elder son, the Crown Prince, 1908; Nicholas II., tsar of Russia, his wife and son, 1918; Paul Doumer, Fr. president, 1932; F.-M. Sir Henry Wilson, 1922; Alexander I., king of Yugoslavia, and M. Barthou, Fr. foreign minister (at Marseilles), 1934. Of unsuccessful attempts at assassination there are examples without number, and the causes which have actuated them are chiefly political distortion or personal animosity. Among the bodies which organise and carry out their fell work are anarchists, nihilists, and similar fanatical organisations. There is not space enough here to recount a list of attempted assassinations, but among the most important during recent years are those committed upon Alfonso XI. of Spain, 1878 and 1879; Amadeus of Spain, 1872; Bismarck, 1866 and 1874; Francis Joseph of Austria, 1853; George III. of England, 1786 and 1800; George IV., while regent, 1817; Humbert I. of Italy, 1878; Isabella II. of Spain, 1847, 1852, 1856; Louis Philippe—no less than 6 attempts during 1835-46; Lord Lytton, 1878; Napoleon I., 1800; Napoleon III., 1855 (twice); Queen Victoria, 1840, 1842 (May and July), 1849, and 1882; William I. of Germany, 1861, 1875, 1878; Theodore Roosevelt, 1912; Mussolini, 1925, and thrice in 1926; Franklin D. Roosevelt, 1933; Venizelos, 1933; Abdul Aziz ibn Sa'ud, 1935; Hitler, 1944.

**Assault.** An A. has been defined as 'an attempt or offer with force and violence to do a corporal hurt to another.' Thus, to present a gun at a person within the distance to which it will carry, to throw a stone or other missile at him, to draw a sword and wave it, or to shake one's fist at a person within striking distance, to attempt to kiss a woman, to incite a dog to attack a person, are all forms of common A. But no words, however insolent and provoking, unaccompanied by an act of violence, amount to an A. A term much used in connection with A. is that of *battery*, and so close is the connection that the word A. is often used in the sense of battery. A battery consists of any kind of corporal injury, however small, designedly done to another by an actual contact with his person. A person assaulted is entitled to retaliate if the retaliation be not in the nature of revenge, but undertaken merely in self-defence and with the object of ending the A. The Scots law in particular is insistent on the discovery of which person struck the first blow in a breach of the peace, and goes slightly further than the Eng. law in excusing retaliation if it does not exceed a just measure of resentment. A person assaulted has two remedies: in the criminal courts, or in the civil court for damages, or both. But if a cause is brought for damages, the defendant, if he has been acquitted by the magistrates in the court of summary jurisdiction, may, if the A. is an ordinary one, obtain a certificate from the magistrate protecting him from all further proceedings. The civil action to which a person who commits an A. and battery is liable is an action of trespass. Strictly the person assaulted should vindicate the public wrong by prosecuting his assailant before pursuing his civil remedy. As. are divided for the purposes of criminal proceedings into common As. and aggravated As. The former is a misdemeanour, and is punishable in the police courts by a fine not exceeding £5 and costs, or, in default, 2 months' imprisonment, or if the case goes to the assizes as much as 1 year's imprisonment may be awarded. Aggravated As. have been defined by a number of statutes and include: indecent As. on women; As. on children; As. on the police and other public officials, including the clergy, in the execution of their duty; As. causing actual bodily harm. These aggravated As. are often classed as felonies, and are punishable with terms of penal servitude. The principals and spectators at a prize-fight are guilty of and are aiders and abettors to an A. The Scots law with regard to A. is similar to that of England, but there is no div., as in England, into 'A.' and 'A. and battery.'

**Assaye**, a vil. of Hyderabad in S. India. It is celebrated as the scene of a battle between the combined Mahratta forces and the Brit. under Wellesley, afterwards duke of Wellington, in 1803. It resulted in a complete victory for the Brit.

**Assaying**, a chemical process the object of which is the determination of the

amounts of certain metals in an ore or alloy. The methods used fall into 2 classes, dry and wet. In a dry assay the ore is reduced by fusion with suitable fluxes, so that the metal is recovered in a pure state. Wet methods are those in which by the action of certain reagents a solution of a salt of the metal is first obtained. The salt may be precipitated and weighed, or the strength of the solution may be determined by observation of the amount required to bring about a certain reaction with a standard solution of known strength. The composition of the salt being known by analysis, a simple calculation will determine the amount of the metal present.

The results of A. processes are dependent for their accuracy on the perfection of the balance used to estimate the different weights of the metals, which should be so constructed as to reveal the most minute differences in weight.

Before proceeding with an assay, it is necessary to obtain a true sample of the material; that is to say, a sample which is likely to contain the same proportions of its constituents as exist in the whole bulk of the material. There are various devices for accomplishing this, the usual method being the div. of a large supply of material into 2 unequal parts, the smaller part being subdivided and so on until a sample of convenient size is obtained. In the case of alloys in a solid state, holes are drilled right through the metal in different places, and the drillings taken for testing.

It is important to determine the amount of moisture in an ore. The simplest method is to heat a sample in an air-oven to a temp. of less than 100° C., when the loss of weight when the mass is quite dry indicates the weight of water in the sample.

The principle upon which the A. of gold and silver by cupellation depends is, that all metals with which those precious metals are usually alloyed are convertible into oxides by exposure to atmospheric air at a high temp., whereas the precious metals themselves remain unacted upon.

The general methods of A. as applied to particular ores, etc., are seen in the following examples:

**Lead.**—The dry assay of galena, or lead sulphide, is carried out by mixing the ore with a flux consisting of sodium carbonate and borax. The mixture is heated in a clay crucible at a red heat for about 20 min. and the fused material poured out. The lead button generally contains impurities, such as silver, antimony, and copper, so that its weight gives too high a percentage. The percentage of lead can also be gravimetrically determined by the formation of the sulphate. The ore is first dissolved in nitric acid, to which sulphuric acid is afterwards added. The excess of acid is removed by evaporation, and a precipitate of lead sulphate remains. This is washed with water to remove the iron and copper salts, and the insoluble matter is treated with dilute sulphuric acid. After filtering, the solid portion is treated with

hot alkaline ammonium acetate to dissolve the lead sulphate. After again filtering, the filtrate is treated with alcohol and sulphuric acid to re-precipitate the lead sulphate, which is then filtered, again washed with strong alcohol, and weighed. When, as is sometimes the case, the carbonate or white lead ore is found in considerable quantities, the process is similar, but a different flux is used.

**Copper.**—The percentage of metallic copper in an ore may be determined by electrolysis. The ore is treated with nitric and sulphuric acids until all the copper salts are dissolved, when the solution is freely diluted and submitted to electrolysis in a glass vessel with platinum electrodes, the copper being deposited on the negative electrode. The process is somewhat lengthy, but gives fairly accurate results. The potassium cyanide wet method depends on the fact that when potassium cyanide is added to a copper salt which has been rendered blue by the addition of ammonia, the colour gradually disappears. The ore is treated with nitric and sulphuric acids and then heated until the nitric acid is evaporated. The pure copper may be obtained from the solution by placing a small piece of aluminium foil in the solution. The copper is soon precipitated and sulphuric acid is added to dissolve the aluminium. The solid portion is washed and then treated with nitric acid, which dissolves the copper. Ammonia is added to the filtrate until it is just blue. The strength may then be estimated by adding the standard solution until the blue colour vanishes.

**Zinc.**—Dry methods are not used, owing to the difficulty in separating the pure zinc from the other metals found in the ores. The chief volumetric method depends on the reaction between zinc chloride and potassium ferrocyanide, zinc ferrocyanide and potassium chloride being formed. The ore is treated with a mixture of potassium nitrate and nitric acid, and a strong solution of potassium chlorate in nitric acid is afterwards added and the mass evaporated to dryness, Sodium hydrate and sodium carbonate are added and the mixture is filtered, after which the filtrate is treated with excess of hydrochloric acid. Any copper present is precipitated by passing sulphuretted hydrogen into the solution, after which the standard solution of potassium ferrocyanide is added. The end of the reaction is determined by testing a small drop of the solution with uranium nitrate. The appearance of a brown tint announces the presence of potassium ferrocyanide in excess.

**Silver.**—In what is called the scorification assay, the ore is mixed with an excess of lead and heated in a scorifier or clay dish. The silver compounds are decomposed, the silver forming an alloy with the lead, and part of the lead oxidising and combining with the other constituents of the ore. The metallic button produced therefore contains a small part of the lead used and all the silver. This alloy is then cupelled.

Cupels are small vessels moulded out of bone ash, which has the property of absorbing molten litharge or lead oxide, whilst the metallic portion is unaffected. The temperature used is just below the melting point of silver until just before the process is complete, when it is suddenly raised. The result is that the lead is oxidised and thus separated from the silver. The assays are slowly cooled so as to avoid 'splitting' of the silver button.

**Gold.** when the alloy consists of copper, is assayed by the same method as is used for silver, and any silver present is removed by the action of strong nitric acid, the metal being previously rolled into a thin plate, so that every part of it may be reached by the acid. When the alloy consists of silver the process is called parting. Generally, however, both processes have to be resorted to. Amalgamation with mercury is also resorted to when gold has to be separated from sand, gravel, &c.

**Iron.**—Dry methods are almost obsolete, and wet methods are all based on the readiness with which ferrous salts can be oxidised to ferric salts, or ferric compounds reduced to the ferrous condition. A standard method is the addition of potassium dichromate to an acid solution containing iron in a ferrous state. The ferrous salt is oxidised and the colour changes to green owing to the formation of a chromium salt. The solution must be continually tested by adding a drop to a little freshly prepared solution of potassium ferrocyanide on a white tile. When no blue colour is produced, the ferrous salt has been completely oxidised. The amount of the standard solution of potassium dichromate used determines the strength of the solution of the ferrous salt.

**Assche, or Asche,** a small tn. in Brabant, Belgium. It is situated 9 m. N.W. of Brussels.

**Assagal, or Assagal,** a weapon for throwing, usually a light spear made of wood and tipped with iron. It is used by all the Bantu peoples of Africa. There are the long and short A.

**Assemani, Giuseppe Simone** (1687–1768), a member of a celebrated family of Syrian orientalisks. When young he attended the Maronite College in Rome, whence he was transferred to the Vatican Library, and afterwards made archbishop in *parlibus* of Tyre. The pope sent him on an expedition to Egypt and Syria in quest of valuable MSS. His successful discovery of 150 of great value resulted in a second and even more successful journey. He ed. and pub. the most valuable MSS. of the Vatican. His 2 great works are the *Bibliotheca Orientalis Clementino-Vaticana rec. manuscr. coad. Syr., Arab., Pers., Turc., Hebr., Samarit., Armen., Æthiop., Græc., Ægypt., Iber., et Malab., jussu et munif. Clem. XI., and Ephraemi Syri opera omnia quæ extant Gr., Syr., et Lat.*

**Assemani, Simone** (1752–1820), grand-nephew of Giuseppe Simone A. b. in Tripoli. Prof. of oriental languages in Padua, and author of sev. works in It. and in Lat. on Arabian literature

and hist. He is best known by his masterly detection of the literary imposture of the Maltese, Vella, which claimed to be a hist. of the Saracens in Syria.

**Assemani, Stefano Evodio**, was the nephew of Giuseppe A., whom he succeeded as librarian of the Vatican. He was also bishop of Apamea, and amongst his works the 2 most important are: *Bibliotheca Mediceo-Laurentiana et Palatina Codicum MSS. Orientalium Catalogus*, with notes by Gori, 1742; and *Acta Sanctorum Martyrum Orientalium et Occidentalium*, 1748.

**Assembly, Church**, see CHURCH ASSEMBLY.

**Assembly, General, of Scotland**, see GENERAL ASSEMBLY.

**Assembly, National**, see NATIONAL ASSEMBLY.

**Assembly of Divines**, see WESTMINSTER ASSEMBLY OF DIVINES.

**Assen**, the cap. of the prov. of Drenthe, Holland. Peat-cutting is the chief industry. Pop. 11,329.

**Assent, Royal**. When a Bill has passed through both Houses of Parliament in the same session it does not become an Act, or the law of the land, until the sovereign has signified his or her consent, such consent being known as the R. A. The Parliament Act, 1911, provides that where a Bill has passed the Commons twice in 3 successive sessions, such a Bill may be presented direct to the king for his assent even if the Lords refuse to agree to its passage. The R. A. is sometimes given by the sovereign in persons but more often by lords commissioner, representing him, the power to do this being conferred by 33 Henry VIII. c. 21. The commissioners are usually 3 or 4 of the great officers of the state, and they hold letters patent under the great seal, signed by the king's hand. They or the sovereign signify the R. A. in the House of Lords, but the Commons are also present at the bar, to which they are summoned by the black rod, and to which they repair headed by the Speaker, the ministers, and the officers of the House. The assent is given in Norman-Fr. in the following picturesque fashion. After the title of the Bill is read by the clerk of the Crown, the clerk of the Parliament says 'Le Roy (or, La Reyne) le veult.' An expression of thanks for the 'benevolence' of 'ses bons sujets' is coupled to the assent to a money Bill, and there is yet another formula for assenting to a private Bill. Should the king refuse his assent to a Bill, the form of announcement is, 'Le Roy s'aviserà' (the king will consider it). But as the sovereign can now act only on the advice of his ministers, i.e. the Cabinet, this contingency never arises. The last instance in which the R. A. was refused was by Queen Anne in 1707, when she refused her assent to a Scotch militia Bill, but in former times the refusal of the R. A. was a common enough occurrence. Queen Elizabeth once at the end of a session refused to assent to 48 Bills out of a total of 91 presented to her. In 1853,

says Prof. Lowell, Queen Victoria was nearly advised by ministers to veto a private Bill obtained by the Fimleco Company because the House of Lords had not permitted the Board of Trade to appear and oppose something which it ought to have opposed before the Private Bill Committee. Unless it is stated to the contrary in the body of a Bill, a Bill becomes the law of the land and its operation commences from the day it has received the R.A. A bill to abolish the use of Fr. in all proceedings in Parliament and courts of justice was passed by the House of Lords in 1706 but was dropped in the House of Commons, so that Fr. is still used for the R. A., although it was enacted in 1731 that all proceedings in courts of justice should be in Eng.

**Asser**, properly **Ashi** (353-426), a Jewish doctor b. in Babylon. He was president of the academy of Sora, or Euphrates. He collected all the Jewish laws, doctrine, and tradition into the Talmud of Babylon, which is ranked above that of Jerusalem by the Gks.

**Asser**, or **Asserius Menevensis**, a learned monk of St. David's, b. in Pembrokeshire. King Alfred made him his preceptor and companion, and promoted him to bishop of Sherborne. *He d.* in 910. In 1572 his life of Alfred, *De rebus gestis Alfredi Magni*, was pub. by Archbishop Parker.

**Assessment** is the fixing by the discretion of the authorised assessor of the value of a property or income for the purpose of taxation or judicial award. See articles on COSTS; DAMAGES; RATES AND RATING; TAXATION.

**Assessor**. The word is derived from the Lat. *adessor*, one who sits beside another, and signified one who was learned in the law and sat by a magistrate or other functionary, such as a governor of a prov., to aid him in the discharge of the judicial duties of his office. In modern times the word has been applied in the reverse sense to one who, having a special technical knowledge, assists a judge to arrive at a decision, though having, of course, no part in the judgment. The Judicature Act, 1873, provided for their employment in all High Court cases, and the Appellate Jurisdiction Act, 1876, empowered the Judicial Committee of the Privy Council to obtain the help of the archbishops and bishops in eccles. causes. In maritime causes particularly **As.** are frequently employed, such **As.** generally being Trinity Brothens. The power to employ **As.** in hearing appeals from the Admiralty Court was conferred on the House of Lords by the Supreme Court of Judicature Act, 1891, and under the Patents Act, 1883, either party in an action to demand that the case be heard with an **A.** The Clergy Discipline Acts require that the bishop inquiring into the case should be assisted by three **As.**, one of whom must be a barrister and another being generally his chancellor. Apart from eccles. and maritime causes, the help of judicial **As.** is not often resorted to, their functions having long since been performed by expert witnesses.

**Assets**, in ordinary commercial parlance, implies any property or stock-in-trade of a merchant or company, and the term in this sense is used generally in relation to bankruptcy and insolvency. The more strict and legal application of the term (which is derived from the Norman-Fr. *assets*, meaning 'enough') is to the real and personal property of a deceased person, which, either in the hands of his heir, devisee, executor, or administrator, is chargeable with the payment of his debts and legacies. Strictly speaking, therefore, the term does not apply to an intestate person's estate or to the estate of a person who dies with no debts to be paid. A. are either *personal* or *real*. The former comprehend goods, chattels, and debts, whilst the latter include real estate (i.e. landed property), whether it descends or is devised to the heir-at-law. Both classes, by the operation of the Land Transfer Act, 1897, now devolve on the executor or administrator in the first place. A. are also divided into *legal* and *equitable* A., a distinction derived from the nature of the claim of the creditors on the heir or administrators of the estate. 'Specialty' creditors, i.e. those whose debts arose from a sealed instrument or bond, were formerly entitled to payment before those whose debts were in the nature of a simple contract, but this privilege has been abolished, and both classes of creditors now rank *pari passu*. The first charge upon a deceased's estate is the expenses of the funeral and the expenses involved in administering the estate. The next charges, if they are legal A., are those which have statutory priority, such as unpaid taxes, rates, judgments of the courts, etc. Next come ordinary creditors, and finally voluntary obligations. In equitable A., however, the executor must pay whoever first obtains a judgment for his debt: he cannot plead that he must keep back any part of the A. to meet other creditors' demands. When all the A. have been expended to meet the demands of various creditors and there are still creditors after the estate is exhausted, the administrator is entitled to protect himself by the plea of *plene administravit*, i.e. that he has fully administered the estate. When this plea is put forward the creditor is awarded a judgment of A. *in futuro*, meaning that he shall be paid out of any A. that may accrue to the defendant. In Scotland, although the word is used in the general sense of property, there is no legal term A. For administration of a bankrupt's A. see **BANKRUPTCY**.

**Assheton, William** (1641-1711), a divine, was b. in Lancashire. He was a voluminous if prejudiced and superstitious writer, as is shown in his work, *The Possibility of Apparitions*. His works include *Toleration Disapproved*, *Danger of Hypocritism*, *The Certainty and Eternity of Hell Torments*. His scheme of insurance for the clergy may be said to be the forerunner of present-day life insurance methods.

**Ashur**, the name of the earliest known

cap. of Assyria. Its site was that of Kalat Sherkat, on the rt. bk. of the Tigris, some 60 m. S. of Mosul. See also **ASSUR**.

**Assideans** were zealous defenders of the unity of the Deity and the belief of their ancestors, who opposed Antiochus Epiphanes (175-164 B.C.) and his successors when they endeavoured to put aside the Jewish religion and to introduce idolatry. The leader of these A. or Chasidim was Mattathias, who killed the commander of the tyrants at the idolatrous altar in Modeim, near Joppa. Antiochus, after an unsuccessful attempt to plunder a temple in Elymais, d. insane. The name Chasidim was given by later Jews to those persons who devoted their lives entirely to religious exercises and bodily chastisements, to expiate their own sins, or those of others, or to hasten the coming of the Messiah. They studied the Cabbalah (q.v.), fasted, and by mortifying the flesh thought to free the spirit from the body, and so to enter into communion with God and angels. About the middle of the eighteenth century a new sect of Chasidim arose, who held the belief that communion of man with God was effected by contemplation and prayer. This sect increased in number, some were considered representatives of God and their works were regarded as oracles.

**Assiento**, or **Asiento**, from the Sp., meaning contract. It is specifically used for a contract or convention between the king of Spain and other powers for supplying slaves for the Sp. dominions in America. A treaty of a like nature was entered into by Charles V. with the Flemings, which compact was the first of its kind. Similar agreements were concluded with the Genoese, Fr. Guinea Company, and England. Out of the disagreement over the A. between England and Spain concerning certain privileges granted to the South Sea Company arose the war of 1739. In 1748 4 years still were due to lapse, but at a cost of £100,000 the Brit. abandoned the A.

**Assignats** and **Mandats**. A. were bonds issued by the Constituent Assembly during the Fr. Revolution on the security of the confiscated landed property of the clergy. These bonds were called A., as they represented land assigned to the holder of these bonds. The first issue of these bonds amounted to 400 million francs (£16,000,000), and were generally in notes of 100 francs (£4) each, though many of them were for lower sums. The object in issuing A. was not only to obtain the full value of the confiscated lands, but also to supply the deficiency of coin in circulation. Shortly after the first issue another 800 millions in addition were issued, but without the liability to pay interest. The last of these 2 issues was made in Sept. 1790. In the beginning of 1791, the Legislative Assembly sequestered for the benefit of the state the property of all the wealthy *émigrés*, and in due course the Crown estates. On these more A. were issued, and by Sept. 1792 the total amount

issued was by a fresh issue of 200 millions brought up to 2700 millions. Towards the end of this year, the double effects of the general insecurity of property and person, and of the depreciation of A. caused by their over-issue, caused a general rise in prices, with its natural concomitant, distress and pillage of shops. To counteract this distress the most extreme measures were taken by Convention, and laws fixing a maximum price to bread and other necessities of life were enacted. In Aug. 1793 there were in circulation 3776 millions of A.; but by a forced loan of 1000 millions, and by the collection of a year's taxes, this amount was reduced to less than two-thirds. Later the wants of the Gov. led to a fresh issue of A. Eventually the enormous sum of 45,500 million francs in face value was in circulation, and the value of A. sank almost to nil, and early in 1796 a louis d'or (24 francs) was considered worth 7200 francs in A. Under the Directory recourse was had to a new kind of paper-money, the mandat. These M. were to enable any person who was willing to pay the estimated value of any of the national lands to enter into possession. They furnished, therefore, a somewhat better security than the A., as these could only be offered in payment at sales by auction. The estimate of the value of the lands was that of 1790, and in many cases this had considerably depreciated by 1795. The mandat of 100 francs at its first issue was worth only 16 francs in silver, and soon fell to a seventieth of its nominal value. The Gov. were soon forced to abandon the M. and declare that they should be received only in payment of taxes and of land. The last issue of paper-money was in 1797, and since then to the outbreak of the First World War, 1914, the legal currency of France was purely metallic.

**Assignment, see ASSIGNMENT.**

**Assignee in Bankruptcy,** a person officially appointed on behalf of the creditors to manage a bankrupt's estate and now termed a *trustee*. See BANKRUPTCY.

**Assignees, see ASSIGNS.**

**Assignment,** in Eng. law, is the name given to a deed or an instrument of transfer, the operative words of which are to 'assign, transfer, and set over,' and which transfers both real and personal property. In Scots law the word *assignment* is used in conveyancing, and corresponds to the Eng. law term A., but in some instances, where statutes employing the phraseology of the Eng. law have been extended to Scotland, the word A. has necessarily obtained a partially technical use. Thus property in copyright, patents, registered vessels, all of which are transferable, are in Scots law also referred to as being assignable. The prin. interests in land to be assigned are estates for life or for any definite period of uncertain duration, and a statute of Charles II. (Statute of Frauds and Perjuries) requires such A. to be in writing. An A. differs from a lease in being a

transfer of the entire interest of the lessor; whereas a lease is an estate for years taken out of a greater estate, creates the relation of landlord and tenant, and reserves to the lessor a reversion. In all under-leases, therefore, it is necessary that part of the original term should remain in the lessor, a day being sufficient. With regard to personal property, A. of goods and chattels in possession is made by bill of sale (q.v.). According to the Eng. common law a chose in action (q.v.) is not assignable. Common examples of a chose in action are the right to sue for a debt, a legacy, damages, etc., and the idea underlying the prohibition to assign these choses in action was to discourage litigation. The rigour of such a position of things was mitigated by the old equity courts, which, on grounds of expediency, sanctioned the transfer of such property, and even in the courts of common law the anct. principle was often evaded. Since the Judicature Act, 1873, every legal chose in action is assignable provided that the debtor be served with a notice of such A. In general it may be said that any form of property is now assignable with perfect freedom, if we except a few cases which are considered contrary to public policy, such as the A. of pensions and the salaries of civil servants. Mortgages can be, and frequently are, assigned, and bills of exchange (q.v.) are assignable on indorsement.

It follows from the definition of assignment as the conveying of the right to a thing and not the thing itself, that in Scots law, in the case of movable property, A. can only take place when that property is in the hands of a third party. To make the transaction complete, formal notice must be given the third party, and until such an intimation has been made the cedent's creditors may attach the property in the hands of the holder. This intimation is an important part of the transfer, for though as between the parties mere knowledge of the transaction is sufficient, in the case of a competition for preference in payment the assignment first intimated will have preference over others which may be prior in date, but of which intimation of assignment has been received later.

A. of property is void if it be with intent to defeat or delay creditors, unless the transfer is made for valuable consideration and the assignee has no reasonable grounds for suspecting fraud.

**Assigns in Eng. law and Assignees in Scots law** is the name given to the parties in whose favour a deed of assignment or assignment is made or property assigned.

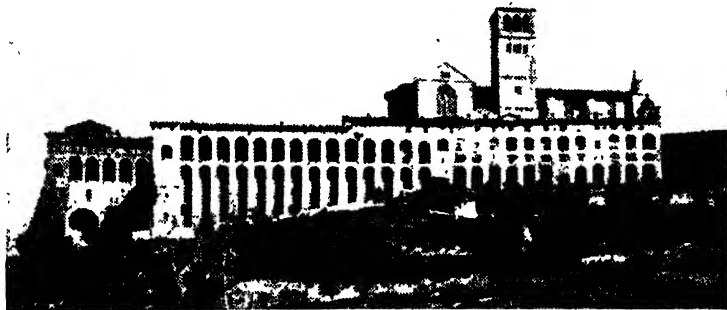
**Assiniboia,** a name previously applied to two dists. of Canada, but now not held by either. The derivation of the word is from the Ojibway *assinin*, meaning stone, and the termination meaning to cook. The first dist. was formed in 1835 by the Hudson's Bay Company, and ceased to exist in 1870 on the transference of Rupert's Land to Canada. The second region was created by an Act of Parliament in 1875. By the Dominion Act of 1905 it was united to the former.

and now forms part of the prov. of Saskatchewan.

**Assiniboine**, a riv. of Brit. N. America. It rises in 51° 40' N. lat., and 105° E. long. It joins the Red R. at Winnipeg. Its course measures about 400 m., and its tribs. are the Little Souris, Qu'appelle, Rapid R., White Sand R., and Beaver Creek. A tribe of Indians takes its name from the riv. Steam communication exists between Winnipeg and Fort Ellice, about 700 m. distant.

**Assinie**, seaport at mouth of A. R. in the Fr. colony of the Ivory Coast. Seized first in seventeenth century by a Fr. trading company. The Fr. occupied it again in 1840 as an outpost but abandoned it to a commercial firm of La Rochelle. Reoccupied continuously since 1882. Exports groundnuts. Pop. 700.

from the Lat. *via* the Norm.-Fr. It is derived from the O.F. *assis*, and comes ultimately from the Lat. *assideo*, to sit by. It is possible that the word A., where it signifies an ordinance, a decree, or an assessment, and which is derived from another Lat. word, *assido*, meaning to assess, fix, or ordain, may in anct. times have been confused with the former word. In the latter sense the word was used for sev. ordinances, chief among which are those known as A. of Bread and Ale, the A. of Clarendon, 1166, and the A. of Northampton, 1176. By the first the price of bread, ale, fuel, and other necessities of life was fixed. The A. of Clarendon was an important ordinance of Henry II. reforming the administration of justice; it contained the beginning of the system of trial by jury. The A. of



ASSISI: THE UPPER AND LOWER CHURCHES OF ST. FRANCIS

E.N.A.

**Assisi**, a tn. of Umbria, Italy, in the prov. of Perugia. The tn. commands a splendid view of the valleys of the Tiber and the Topino, as it is situated on a mt. 1345 ft. above sea-level. The tn. owes a great deal of its fame to being the bp. of St. Francis, who was b. 1182 and d. 1226. Directly after his canonisation the Franciscan monastery was begun, and completed in 1253. The building is a magnificent example of Gothic architecture. In 1818 the sarcophagus containing his remains was discovered, and a crypt was consequently added. In the lower church are decorations by Cimabue and Giotto. A feature of the tn. is the castle of medieval style built by Cardinal Albornoz in 1367. It is 1655 ft. up and was added to by Popes Pius II. and Paul III. To the S.W. of the tn. is a large church where St. Francis is said to have died, and which contains his original oratory. The tn. is famous as a pilgrimage resort and for its influence in the hist. of It. art. Metastasio was b. here in 1698. Pop. 20,000.

**Assiut**, see ASYUT.

**Assize**. This word, like so many other legal terms, came into the Eng. language

Northampton still further removed administrative machinery from the control of the barons. The As. of Jerusalem were a code of feudal laws formed in 1099 for the new Christian kingdom of Jerusalem founded by the Crusaders.

The most common connotation of the term A., and that in which it is almost exclusively used at the present day, is that which denoted the session of High Court judges held periodically in each of the cos. of England and Wales. Their origin is to be found in articles 22 and 23 of Magna Charta, which provided that judges should visit each co. to take As. of *novel disseisin* and *mort d'ancestor* (abolished in 1835), i.e. to settle disputes about the possession of land. Prior to this, by the common law, the administration of justice was confined to the judges sitting in term at Westminster and to justices in eyre (i.e. itinerant judges), whose circuits sometimes took 7 years to complete. The Statute of Westminster II., passed in the thirteenth year of Edward I., enacted that the justices should be 2 sworn judges, and that they should hold court in each shire not more than thrice a year. Since the passing of



1 William IV., c. 70, these courts have been held generally twice, but sometimes thrice, a year on a regular system, the country being divided for this purpose into *circuits* (q.v.). London and Middlesex do not come within the circuit system, the administration of criminal justice being at the Central Criminal Court (q.v.). Judges in the A. courts are as fully qualified to deal with all questions of law and fact as are those of the High Court, and in practice are always judges of that court. Their powers are now derived from 4 authorities: firstly, a commission of *oyer and terminer* (q.v.); secondly, a commission of *gaol delivery* (q.v.); and, fourthly, a commission of *nisi prius* (q.v.). The Scottish courts of justiciary are circuit courts somewhat similar in their function to the A. courts of England, but in civil causes they are practically limited to hearing appeals from the small debt courts. Only occasionally is a civil trial by jury transferred from the court of session to the court of justiciary. There are 3 circuits, N., S., and W. (the court of session being at Edinburgh in the E. of Scotland), in which courts are held twice a year, but owing to pressure of work, Glasgow, Perth, Dundee, and Aberdeen have additional courts.

**Assmannshausen**, a vil. in the dist. of Wiesbaden, on the Rhine, 2 m. from Rüdesheim. It is celebrated for its wine. Pop. 1500.

**Associated Counties.** In 1642 Essex, Cambridge, Norfolk, Suffolk, Hertford, and later Lincoln and Huntingdon, formed a league to defend their ters. from destruction during the Civil war. Their troops were commanded by Lord Grey of Wark and later by Cromwell.

**Associated Press of America.** This is an Amer. body, which claims to be the largest co-operative news organisation in the world, and in support of this claim points to the fact that it represents 1200 daily and Sunday newspapers. It works with over a score of other news agencies abroad and provides its members with 'spot' news, objectively presented. Its rival is the United Press of America.

**Associates**, the term applied to clerks of the Crown office, who were once 'associated' with the judges of the commission of assize. They are officials of the King's Bench Div. of the High Court, and must be barristers or solicitors. Their duties include keeping the records of the court; the preparation of the cause lists, attendance on the judge in court, and the entering up and delivering to the right quarter the verdict and record of the case.

**Association.** The, a league, the full name of which was 'The National Association for King William,' formed in 1696 to protect the king against polish plots, as a result of the recent assassination plot. It enjoyed considerable popularity.

**Association Football.** see FOOTBALL.

**Association of Ideas**, an important term in philosophy and psychology first used by the Eng. philosopher Locke, but given by him a very limited reference,

and used rather to connote mental idiosyncrasy than as a term explanatory of the operations of thought generally. The office which A. performs is to connect and arrange ideas, to regulate the succession of the thoughts. When one thought is suggested by another, or when a train of past images is summoned by something present, whether spontaneously or by an exertion of the memory, the process by which this is made is called A. Thus by an A. of I. 'lightning,' either actual or the mere word, suggests 'thunder,' and 'black' suggests 'white,' 'funeral,' or 'negro.' David Hume, the Scottish philosopher, was the first modern writer who traced the influences of our As. to certain principles, which he denominated 'resemblance, contiguity in time or place, and cause or effect,' but Aristotle in his treatise on memory had enumerated 3 principles of A., viz. similarity, coadjacency, and contrariety. This last category, contrariety or contrast, is now generally abandoned, for on reflection it will be seen that all associated contraries can just as well be classed under contiguities. In the same way causation is merely another case of contiguity, and most modern writers assign A. of 1. to 2 great principles: *likeness* and *proximity* (or, more technically, similarity and contiguity). Two examples of A. arising from contiguity have been given above. In the first case the A. arises purely from contiguity (of time), for our brain has recorded the fact that immediately after most flashes of lightning there has been thunder. As for the second example, it is obvious that although 'white' is the contrary of 'black,' it is also contiguous (in time and place) to it, for we cannot think of 'white' (a relative term) without at the same time thinking of the 'non-white' surroundings, i.e. black. The law of similarity may be defined as *present* impressions which tend to revive a memory of *previous* like impressions. If the mind were only capable of working on the principle of contiguity we should recall nothing but that in which some connection was already formed. There may be large classes of our As. which are not referable to any of the above principles, e.g. the terms of art and the words by which we designate moral and intellectual qualities and operations; in short, the whole vocabulary of language, in which there is next to no connection, either in the way of resemblance, contiguity, cause, effect, or contrast, with the ideas or objects represented, although none of them ever fails to summon up the images of the things for which they stand. But, according to Spencer, anomalies like this, when reducible to certain limits, establish rather than invalidate the laws to which they form an exception. While thought is intensely directed to a particular subject, the As. act in subordination to that which is for the time 'the ruling idea of the mind'; when this mental intensity subsides, the attention ceases to concentrate the faculties of thought and the mind relapses into its ordinary mood in

the absence of excitement. Hence the attention which fixes the thoughts controls the As.; the relaxation of attention which allows the thoughts to wander grants the same liberty to the As. The associationist school is the name given to those psychologists who endeavour to explain all mental processes by the theories of A. of I. This school is almost entirely Eng., but it includes the Fr. thinker Condillac. Hobbes, Hartley, and Hume may be said to be the founders of the school, and notable representatives of it in more recent times are the two Mills, Herbert Spencer, and Prof. Bain. Diversity of opinion exists among the associationists, some, like Hartley, emphasising the predominance of contiguity, whilst others, who number among them Herbert Spencer, insist on the importance of similarity. This latter section is still further divided by those who would make a contrast a distinct principle. In recent years psycho-analysis has made great use of the principle of A. of I. in securing that catharsis which is the basis of mental therapy. From the psycho-analysts the police have adopted the idea as an aid to the discovery of crime by the interrogation of suspects, of the 'third degree' as applied in the U.S.A. See articles on the respective writers above mentioned, and on **PSYCHOLOGY**.

**Assoilzie** (O.F. *assoiler*, and Lat. *absolvere*, to absolve), a term in Scots law meaning to absolve from a claim, to acquit, to pronounce not guilty.

**Assonance** (Lat. *assonare*, to respond to), a form of rhyme not strictly correct. In the final words it is sufficient to have similar-sounding vowels irrespective of the consonants connected with them. It is a form that is popular in much of our rustic verse. In foreign literatures A. is studied and cultivated to an artistic degree. It appears to have played an important part in the evolution of rhyme. A preference for assonant rhyming is found among the Romance languages, while in the Teutonic the reverse is the case. One reason, of course, is that the harsher and more discordant consonants of the Teutonic tongues have a more distorting effect upon their vowels. In Sp. literature A. is cultivated and recognised as the most popular form of rhyme. Its use in prose serves to ornament it and to point to skill in the stylist, but often the occurrence is due to coincidence. Some poets of to-day make extensive and effective use of it, but its use is not generally admitted to be justified in 'classical' Eng. literature.

**Assos**, or **Assus**, a tn. on the gulf of Adremyttia (Edremit), Mysia. It is in ruins, and expeditions for the purpose of excavation have unearthed a bath, a theatre, a senate house, and 7 Christian churches. Its site is now occupied by the Turkish vil. Behram.

**Assuan**, see **ASWÂN**.

**Assumpsit** (past tense of Lat. *assumo*, barbarously signifying 'I undertake'), an old form of action under the common law so called because the defendant was said

to have taken upon himself (*super se A.*) to pay the plaintiff so much money. It was used to recover damages for breach of a simple contract, i.e. a contract not made under seal, but in form the action was similar to an action for trespass. The action could not be sustained unless the promise to pay had been expressly made, either by an actual written instrument, such as a promissory note, or implied, as when a householder receives goods delivered by a tradesman, or an innkeeper undertakes, by his action of receiving a traveller, the responsibility for the security of the goods of his guest. Like so many other common law forms of action, the action for A. has been superseded by such statutes as the Common Law Procedure and the Judicature Acts.

**Assumption, Feast of**, a festival of the Christian Church celebrated on Aug. 15 to commemorate the ascent into heaven of the mother of Christ. Its authority is taken from apocryphal sources. The festival was first instituted by the Emperor Maurice in A.D. 582.

**Assumption, Paraguay**, see **ASUNCIÓN**.

**Assur**, a Heb. name for the dominion of Assyria. It is mentioned in the O.T.

**Assur**, the mythical founder of Assyria, and probably identical with the Asshur of Gen. x. 22, son of Shem. Gave his name to the country of Assyria and to its cap. A. was above all a god of war, and his symbol—the figure of a god in a horned cap, in the act of shooting an arrow from the bow, enclosed in a circle—was the ensign under which the Assyrians marched to battle. His name is frequently associated with that of the goddess Ishtar.

**Assurance**. This term is often applied specially to life as distinct from fire and other clauses of insurance, but A. and insurance are practically identical. The term is also frequently applied to grants or conveyances of interests in land. See **INSURANCE**.

**Assur-bani-pal**, king of Assyria. He succeeded Esar-haddon in 669 B.C. The chief events of his reign were the suppression of an insurrection in Egypt, the defeat of Te-umman, king of the Elamites, and the conquest of Babylonia, of which the king, Sarnas-sum-yukin, brother of A., had revolted against the Assyrian overlordship. In spite of these successes, the reign saw the beginning of the decline of Assyrian power.

**Assynt, Loch**, a fresh-water lake of S.W. Sutherland. It is 215 ft. above sea-level. Its length is 6 m., and its breadth 2 m.

**Assyria**: in Assyrian inscriptions **Assur**; in the Persian, **Athura**; in the Median, **Assura**. It was the northernmost country that occupied the great Mesopotamian plain. Its boundaries were, on the N. the Niphates Mts. of Armenia, on the S. Susiana and Babylonia, on the E. Media, and on the W. the Tigris or, more accurately, the watershed of the Euphrates. Its length was about 280 m. from N. to S. and its breadth 150 from E. to W. It is interrupted by mt. masses on the N. and E., and drained by the Tigris and its affluents. The most fertile part of

the country, Adiabene, lay between the Zab Rs. The anct. cap., Ninus (Nineveh), founded by the king of the same name, was, according to Strabo, situated on the Tigris and in the Aturian plains. Conjecture identifies its ruins with those on the Tigris opposite Mosul. A's political importance was due to its position between the Semitic tribes and Iran. It attained a high standard of civilisation, proof of which exists in the testimony of old writers and in the existence of the ruins of huge cities, of irrigation contrivances and canal routes. Modern excavations have yielded, too, many relics of great value in art, and show the lofty intelligence possessed by the Assyrian peoples. Nineveh is the centre around which many of the ruins are grouped, while farther S. a continuous line of ruins extends along the Tigris from Tekrit to Bagdad. The magnificent country was reduced to its present barrenness under Moslem rule. Among anct. authorities there is much divergence of opinion respecting the actual hist. of the Assyrian empire. Ignoring the less trustworthy authorities, we find in the Bible (Gen. x. 11) information that Nineveh was founded from Babylonia. In fact both Babylonia and A. had so many characteristics in common and were moreover so closely connected one with the other, that to read of the rise of one is but to learn of the fall of the other. Recent excavations have borne out the fact of Nineveh's situation in Babylonia. From inscriptions on bricks from the old cap., Assur, has been gained the information that the original rulers of the land were called Patesi, and the city itself bore the name of Pal-bi-ki. No further information is available till the year 738 B.C., when their king, Pul, or Tiglath-pileser III., invaded Palestine and was paid money to evacuate by Menahem, king of Israel. During the same reign Ahaz (Jehoahaz) became a vassal of the court of A., while those tribes beyond the Jordan were carried off as captives in 734 B.C. Sargon, 'the Tartar,' who had deposed his master Shalmaneser, captured Samaria in 722 B.C. In Isaiah mention is made of the siege and capture of Jerusalem by Sargon and also the siege of Ashdod (712-711 B.C.). The latter event has no connection with the siege in 701 by Sennacherib. The next record is that of Esar-haddon, son of Sennacherib. Esar may be given first place in the rank of the most powerful of the Assyrian rulers. He extended his dominions to the Mediterranean and acquired Egypt by conquest. In the book of Judith, the record of Holofernes' expedition is too much involved in obscurity to warrant much reliance being placed upon it.

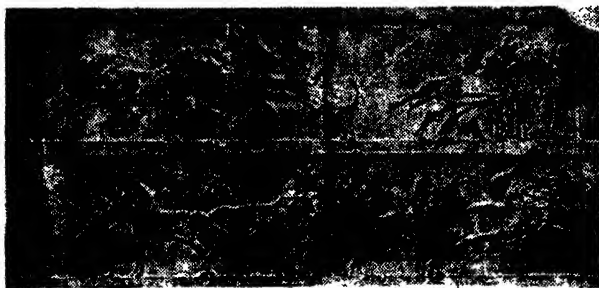
From this time the empire seems to decay, and its decline had assumed such a stage that a union of Nabopolassar of Babylon and Cyaxares of Media was formed for the destruction of the country. The resulting war was protracted by an invasion of the Scythians, who prevented by counter-attraction any harm from Cyaxares. Eventually, however, Nineveh was captured and destroyed about the

year 605 B.C. In alliance with Media, an Assyrian rebellion met with signal failure in the time of Darius Hystaspes. The cap. had quite ceased to be during the reign of Herodotus. The actual ruins of the city were noticed by Xenophon, who testifies to the height of the ruined walls (150 ft.). (See also under NINEVEH.) A minor tn. seems to have flourished during the reign of Claudius on the old site. In Tacitus the last mention is made of the tn. A hist. of the city by Ctesias, largely the product of an imagination soaring above the facts at his disposal, is based upon partial Gk. and Persian myth. At the time his work was received with some credit, but recent investigations have proved the error of his statements. In 600 B.C. A. became a Median prov. and subsequently, together with Babylonia, it formed one of the principalities of the Persian empire. In 331 B.C. Alexander defeated Darius Codomannus at Gaugamela. In A. Twenty years later A. became part of the kingdom of the Seleucids, whose cap. Seleucia was situated on the R. Tigris. Under the Parthian kings the cap. was transferred to Ctesiphon, and was at times in possession of the Romans. The successors of Mohammed destroyed the Persian kingdom of the Sassanids, and A. now came under the rule of the caliphs. Their cap. was Bagdad during the years A.D. 762-1258. From 1638 it has been governed by Turks, after being captured by them from the Persians.

Before the Assyrian monarchy began its fascinating hist., that of Babylonia had already approached its end. In early times the governors of Assur were those appointed by Babylonian monarchs. In the seventeenth or sixteenth century B.C. they had acquired sufficient power to establish their independence at Assur. Guerrilla warfare on the border was for some considerable time maintained, with an occasional peace, produced by alliances of marriage. Of the actual kings of A., apart from the governor appointed by Babylonian rulers, Bet Kapkapi was the first. The ter. along the Tigris was in his possession, although under the rule of his successors its extent varied with their constantly changing success. The actual beginning of its powerful position dates from the reign of Rimmon-nirari I. in 1320 B.C. Calah was founded by Shalmaneser I., his son, and his grandson, Tiglath-Adar I., rose so high that an invasion of Chaldaea resulted in the capture of Babylonia in 1280. The first Assyrian empire was founded by Tiglath-pileser I., his descendant, about 1140. Success favoured his reign, and it is at this point that A. rose to the height of its early power. Throughout W. Asia, from Elam to the Mediterranean, from Armenia to the Persian Gulf, its dominion extended. Sippara and Upija were annexed, and Chaldaea was made a trib. state. Westwards his energies led to the possession of Cilicia, involving the capture of Carchemish and the vassalage of the Arvad people, with the ownership of the cities of N. Phoenicia. From this

point of eminence, however, a decline set in. The succession of Assur-bel-Kala, his son, with an administration as weak and futile as his father's was strong and irrepressible, saw a decay as rapid as its rise had been. So great had been the fall that we find the once all-powerful Assyrian empire bowing in homage to the Armenian monarch. This low condition was not permitted long to continue. A new dynasty, founded by Assur-dân II. in 930 B.C., once again caused the fallen empire to raise itself above the horizon. A succession of wars, cruelly carried out, under Rimmon-nirari II. and Assurnatsir-pal, again led to the recovery of the old supremacy of A. Besides the restoration of all the former provs. further annexations were made in N.E. Armenia and Kurdistan. The cap. was removed during the middle empire from Assur to

general revolt of the provs. Sargon, Tiglath's second successor, ascended the throne with one object nearest his heart. That was the conquest of the Babylonian kingdom. After a bloody succession of affrays he accomplished his desire. The successful invader then built a splendid palace for himself of extraordinary grandeur at Dûr Sharrukin. Explorations of it have resulted in the discovery of some beautiful sculptures, which form to-day one of the most valuable acquisitions of the Louvre. In 675 the Assyrians embarked upon one of the most important campaigns connected with their hist. It resulted in the subjugation of the Egyptian ter. With this event the whole of the anct. world came under one rule, and it is not surprising that the idea of a universal empire for the whole world was now born. The statue of the king



British Museum

## AN ASSYRIAN HUNT

A bas-relief from a slab found at Nineveh.

Calah, and gorgeous buildings were constructed by the kings. Assurnatsir-pal has been found to have been the most outrageously cruel of a line of kings remarkable for their cruelty. Utter ruthlessness and disregard for human suffering seem to have been characteristic of Assyrian rule. An Assyrian code found by the Ger. Oriental Society, which in 1910-16 excavated the site of Assur, is far more harsh than the Babylonian code of Hammurabi. By the time of Shalmaneser II. the dominance of A. had spread throughout the whole of W. Asia, and it was during this reign that a series of synchronisms was created between Assyrian and Heb. annals. Still further additions were made to the ter. under his son, Samas Rimmon II. (823-810 B.C.), and now for the first time the Assyrians met the approaching Aryan tribes. Strangely enough, the turning point of Assyrian power coincides with a solar eclipse, records of which are found in the Assyrian eponymous canon. A spirit of revolt became manifest, and a new method of gov. proved the saviour of the country under Tiglath-pileser III. The revolution, however, was still dormant, and showed itself again shortly after in a

Esar-haddon was carved in the rocks at Baal-Rasi, and an inscription was engraved recording the event. In 669 B.C. Esar-haddon d. during a second Egyptian campaign. Of his abilities as a ruler, it is sufficient to say that no Assyrian king had exhibited such a high standard of administrative talent together with military genius. His son, Assurbani-pal, during his reign continued the campaign and embarked upon fresh ones with a success that is almost monotonous. With all his military exertions he had time to devote to the patronage of arts and letters. Indeed, with his reign the culminating point of Assyrian power is reached. A severe blow was now aimed at the empire. His brother had been installed viceroy during the absence of the army in other lands. He took advantage of the moment to organize a gigantic revolt. The Elamites, Arabs, and Egyptians joined forces, and for 5 years the revolution raged. At the end of that time the Assyrians had conquered the revolutionists and destroyed the allies. But the effort had been more than ordinarily weakening in its effect. So vast an achievement could have only one consequence, gigantic though the military

resources of A. were. Everywhere the foundations of Assyrian rule were shattered. The viceroy of Babylonia declared himself king, and his successor Nabopolassar, whose son was Nebuchadnezzar, in the face of all authority avowed his independence. The last Assyrian king of note was Esar-haddon II. Inscriptions testify to the invasion during his reign of a formidable army composed of the united forces of Aryan and Turanian tribes, Medes, Gimmerians, and Armenians. A period of anarchy followed the death of Assur-bani-pal, and A. now became a prov. of Media, after the destruction of Nineveh.

The religion of A. was simpler than that of Babylonia, though of course it originated from the Babylonian. In character it was polytheistic, yet without the innumerable deities of the pantheistic creed. Every object and phenomenon in nature was believed to be animated by a spirit. Assur (*q.v.*), the national god, was regarded as the spiritual founder of the race. Ignoring the lesser deities, the gods of A. may be divided into 2 prin. triads. First is the 'nature' triad. A description of this group is contained in the 'Chaldean creation tablet,' and comprising *Anu*, the father of all the gods, who was regarded as the progenitor, termed 'the heaven'; *Bel*, called 'the lord of the world,' who was the ruler of the earth; and *Ea*, who was one of the most prominent of the Assyrian gods. He was termed 'lord of the sea,' and was the lord of wisdom and knowledge. Next is the celestial triad, containing the 'moon god,' *Sin*; he was called the 'lord of laws'; the god of the sun, *Shamas*, whose appellations include 'the judge of heaven and hell,' 'the lord of light.' The morning and evening hymns to him constitute the most perfect specimens of Assyrian sacred literature. *Adad*, synonymous with *Ramman*, was the god of storm and thunder. *Ishar*, the goddess of the crescent moon and 'queen of the stars,' was the third member of this triad. She is given many and varied attributes, including those of 'queen of war' and 'archeress of the gods.' The most important of the lesser deities was Marduk or Merodach, the son of *Ea*. The importance of his position as mediator between the immortals and men necessitated a great amount of invocation. Next were *Nabu*, son of Marduk, the scribe and messenger of the gods, in whose hands were the Tablets of Fate, and his consort, *Tashmetu*. All the collections of MSS. and other embodiments of learning were dedicated to him. Some of the terms applied to him were 'the wise god,' 'the enlarger of the mind.' Two statues were found at Nimrud (Calah), now in the Brit. Museum. *Nergal* (*q.v.*), a solar deity, was god of war and hunting, and king of the lower regions. The title of 'the great devourer' was assigned to him as, in addition to being god of war, he was god also of death or destruction. *Nusku*, the new moon, was a light and fire god associated with *Sin*, and appears sometimes as the latter's son. The actual rites performed in the worship of these

gods resemble those of Babylonia, from which, indeed, they are taken. Among them were morning and evening sacrifice, and the offering of bread, wine, and milk.

It is now recognised that the Assyrians were a branch of the Semitic peoples. Hence they belonged to the same race as the Syrians, Phœnicians, Jews, and modern Arabians. Semitism was first estab. in Chaldæa some time before the twenty-first century B.C. The pressure of invaders from the E. drove the Semites from Chaldæa, where they had been the dominant race. From here they went to the S. countries of Asia Minor, Carthage, Sicily, Spain, and W. Africa. From their traditions clues to a close connection with Ethiopia, Arabia, and the cities of the Euphrates have been discovered. Their language, it is apparent, is related to the N. branch of the Semitic. In certain points it comes near the Arabic.

One of the most important discoveries arising from the explorations that have been organised was that of an extensive library. This was unearthed in the palace of Assur-bani-pal at Nineveh, and it contains thousands of tablets. Numbers of them repose in the Brit. Museum. The name of Assur-bani-pal is inscribed upon most of them, though it is probable that, directly, the presence of such a fine collection is due to the foresight of Esar-haddon. References to old copies have led to the truth that these tablets bear inscriptions taken from former and older specimens, and duplicate copies have been discovered in Babylonia. It is apparent that the object of the library was to act as a preventive to the custom of sending their youth to be educated at Babylonia, where a risk was certain of their imbibing prejudices and assimilating dangerous political ideas. Tablets containing learning on the subjects of old languages such as the Akkadian and Sumerian, text-books on mathematics, tables of square and cube roots, lists of birds, plants, and animals, and geographical works point to the educative influence for which the collection was intended. But in richer and far more numerous quantities were the tablets of poetic and mythological literature. Among these discoveries was that, in 1872, of a number of poetic legends relating to the career of the great Chaldean hero Gilzdhubar. The eleventh tablet of this series contains an account of the deluge, and striking similarities to the Heb. version occur. Here the flood is ordained as a punishment for evil-doing, while the name of the builder of the ark is Samas-Napisti (interpreted 'the living sun'). The mt. of Nizir is the landing-place, while the duration of the rain is 7 days. The differences which occur point to the fact that the different versions were taken from one older and common legend and coloured with local facts and landmarks. The resemblance to Genesis which is borne by later-discovered legends describing the phases of creation is extraordinary, while the

psalms and hymns possess exquisite beauty of diction.

How much the general reader owes to the work of those engaged in excavation it is difficult to say adequately. Much has been done, and among the most remarkable monuments now in London at the Brit. Museum are 2 winged human-headed lions rising to a height of 12 ft., winged human-headed bulls quite as ponderous, winged sphinxes, and the famous black marble obelisk. The subjects of inscription on the last-named include a victory, a prisoner acknowledging submission to a king, and foreign people paying homage, while the animals portrayed include the Bactrian camel, elephant, lion, and rhinoceros. The work in bas-relief is of a quality unexcelled in oriental art. It is characterised by a spirit of accuracy, grace, and artistic touch difficult to realise as work of such an age. The Assyrian kings being great fighters and hunters, the favourite themes of the sculptor are the marching of an army, an attack, a pursuit, a siege, the fording of rivers, lion-hunting, and the counting by secretaries of the heads of game taken in a hunt, or the estimating of prisoners of war. In the ruins of Assur-bani-pal's great palace at Nineveh, a series of such sculptured bas-reliefs has been found, and is now to be seen in the Brit. Museum, illustrating the hunting prowess of the great king. Quaint concessions are sometimes made. An instance is the drawing of 5 legs to a bull in order that from every point of view 4 may be seen, and similarly in order to dispel confusion arising from the portrayal of a ladder placed against a wall, it is turned to face the observer. There is little to be gathered, however, about private life from the work. The principle of the arch, the use of the level, and the construction of aqueducts and drains were accomplishments all known to the Assyrians, while their ornaments exhibit skill in the working of metal. Assyrian architects possessed a great advantage over the Babylonian, in that marble was procurable in large quantities, whereas the Babylonians had to rely solely on brick. Sennacherib, early in the seventh century B.C., built a wonderful palace at Nineveh, and left inscriptions describing the progress of the work. His palace, and that of Assur-bani-pal, have both been excavated, but little of the actual city of Nineveh has been explored. The palace of Sargon II. at Kirsabad (Dür Sharrukin) is another splendid example of Assyrian architecture. Excavations have also been carried on at Assur and at Nimrud, or Calah, but the sites of other Assyrian cities are as yet hardly touched.

**Bibliography.**—Sir A. H. Layard, *Monuments of Nineveh*, 1849; Oppert, *Histoire des Empires de Chaldée et d'Assyrie*, 1865; C. H. W. Johns, *Babylonian and Assyrian Laws, Contracts and Letters*, 1904; M. Jastrow, *The Civilization of Babylonia and Assyria*, 1915; A. T. Olmstead, *History of Assyria*, 1923; Louis J. Delaporte, *Mesopotamie*, 1925; Sir E. W. Budge, *Rise and Progress of Assyriology*,

1925; H. R. Hall, *Ancient History of the Near East*, 1927; *Universal History of the World*, vols. I. and II.; D. Mackay, *The Ancient Cities of Iraq*, 1926; C. Leonard Woolley, *The Sumerians*, 1928, *Ur of the Chaldees*, 1929, *Ur Excavations*, 1934, and *The Ziggurat and its Surroundings*, 1938; Gerald Heard, *The Source of Civilisation*, 1935; and Seton Lloyd, *Foundations in the Dust*, 1947.

**Ast.** Georg Anton Friedrich (1778–1841), a great Ger. scholar and teacher, was b. at Gotha and d. at Munich. He went to the univ. of Jena in 1798, where he studied philosophy and philology. In 1802 he became an academical lecturer at Jena; and in 1805 was appointed prof. of anc. literature in the univ. of Landshut, which institution was transferred to Munich in 1812. He wrote many philosophical and philological works, and during the latter part of his life gave most of his time to the study of Plato. His *Platons Leben und Schriften* is an excellent work. In 1809 he began to edit separate dialogues of Plato; and from 1819 to 1832, he pub. a complete ed., with a Lat. translation and a commentary. His *Lexicon Platonium* was pub. 1834–39.

**Astacus**, a genus of decapod crustaceans. *A. serratus* is an Australian crayfish; *A. gammarus* (or *Lomarus vulgaris*) is the lobster (q.v.). An astacian is a member of the family, and an astacite is a fossil crayfish.

**Astarte**, see ASTORETH.

**Astatic Couple**, 2 magnetised needles mounted one above the other, and parallel, but with the poles reversed. If the strength of the 2 magnets is nearly identical, the couple will show little tendency to set N. and S., but will still be sensitive to an electric field. Hence A. Cs. are used in astatic galvanometers.

**Astell**, Mary (1668–1731), Eng. authoress, b. at Newcastle-on-Tyne. Her uncle educated her in Lat., Fr., logic, mathematics, and natural philosophy. She finished her studies in London, and pub. in 1691 *A Serious Proposal to the Ladies, wherein a Method is offered for the Improvement of their Minds*. It advocates the establishment of a kind of Protestant nunnery. Her other prin. work was *The Christian Religion as Professed by a Daughter of the Church of England*.

**Aster**, a large genus of Compositæ universally grown. The China A. is a species of the allied genus *Callistephus* and not the A., though it is sometimes called *A. chinensis*; it grows in China and Japan, and is properly known as *C. hortensis*.

**Asterabad**, see ASTRABAD.

**Asteria**, or Star-stone, the name applied to a stone which, when cut in the form of a dome, shows a star of 6 rays. Especially used of an imperfect variety of sapphire, which is bluish-grey in colour and is milky or opalescent. Asterism is the name given to the optical phenomenon of a star-shaped figure which is exhibited by some crystals. Asteriated sapphire gives rise to this phenomenon

by reflected light, and some forms of mica by transmitted light. Asterism is also the name of any group of stars smaller than a constellation.

**Asteria** or **Asterie**, in Gk. mythology, the daughter of the Titan Coeus and Phoebe, sister of Leto, mother of Hecate. To escape the embrace of Zeus, she took the form of a quail (*ortyx*), and threw herself into the sea, where she was changed into the is. A. or Ortygia, afterwards called Delos.

**Asterias** (Gk. *ἀστέρ*, star) is the name of a genus of starfishes, of family Asteriidae and phylum Echinodermata. *A. rubens*, the 5-rayed starfish, is common to the North Sea, *A. glacialis* to other European seas. Starfishes are found throughout the world.

**Asteroids** is the name given by Sir William Herschel in 1802 to what should more properly be termed, as they are sometimes planetoids. These planetoids, now usually known as minor planets, are, as this latter name indicates, a numerous group of very small planets not visible to the naked eye, situated in the solar system between Mars and Jupiter. The discovery of Uranus by Herschel in 1781, which first broke through the old opinion that the number of planets was complete, and the gap between Mars and Jupiter which Bode's law (*q.v.*) indicated should be filled by some planet, gave an impetus to the search for a new planet, which resulted in the discovery by Piazzi at Palermo on Jan. 1, 1801, of the first and largest of the A., Ceres. On Mar. 28 of the next year Olbers at Bremen discovered Pallas; on Sept. 1, 1804, Harding of Göttingen found Juno; and on Mar. 29, 1807, Olbers found the fourth planetoid, Vesta. It was not till Dec. 8, 1845, that Hencke at Briesen discovered Astræa, and he added a sixth to the list in Hebe, found on July 1, 1847. Since that date no year has passed without the addition of some A. to the list, and at the present time over a thousand are known, and apparently there is no limit to their numbers.

The introduction of the photographic method by Dr. Max Wolf in 1891, now exclusively used for detecting these bodies, has enormously accelerated their discovery: *e.g.* in 1908 117 were found. The photographic plate is fixed to a telescope worked by a mechanism which follows the apparent motion of the 'fixed stars.' It follows that if the plate be long exposed, any heavenly body with a proper motion will be detected owing to the fact that its image on the plate will be a short streak instead of a round disk. The 4 largest As. are Ceres, Pallas, Vesta, and Juno, whose diameters are respectively 480, 306, 241 and 121 m.: the diameters of the majority of the As. are considerably less than 50 m. and Shapley and Nicholson have detected and measured one whose diameter is 3 m.: this is, therefore, the smallest planet whose dimensions have been ascertained.

The total mass of all the A. probably does not exceed one-thousandth of the mass of the Earth and in any case must

be less than that of Mars, for otherwise noticeable perturbations of Mars in its orbit would be detected. There appears to be no lower limit to the size of the A., a fact which indicates that they are meteoric rather than planetary bodies. This is supported by the fact that their orbits are often very eccentric, *e.g.* that of Pallas is inclined at 35° to the ecliptic.

Most of the A. are fainter than the tenth magnitude, and it is surmised that they are irregular masses of rock, and no A. appears to possess an atmosphere.

Eros makes the nearest approach to the sun, and is of great importance for determining the solar parallax.

After the discovery of the larger A. it was suggested that they had their origins in the breaking up of a larger planet. A later suggestion was that the A. were originally distributed in a ring round the sun (*cf.* Saturn's rings), and that perturbations by the planet Jupiter broke up the ring, giving rise to the present A., but it is not possible to state whether either theory is correct.

**Asthenopia**, weakness of the muscle of the eye or of visual power, due to overuse, anaemia, or errors of refraction.

**Asthma**, a paroxysmal affection of the bronchial tubes characterised by cough, laboured breathing, and a feeling of suffocation. There is little known about the cause of the disease; but in 50 per cent of all cases it is a hereditary affection, and is therefore probably due to a constitutional peculiarity, such as a singular sensibility of the local muscular fibres to spasmodic contraction. The immediate cause of a paroxysm may be the inhalation of an irritant, such as chemical vapours, smoke, fog, dust, and emanations from plants or animals; gastric or intestinal disturbances; emotional excitement or increased blood-pressure; or the presence of some chemical substance or toxin acting on the respiratory centre.

The paroxysm usually comes on at night and at a particular time. The patient has a feeling of suffocation, sits up in bed and grasps the knees, or bends down with the palms on the bed so as to raise the shoulders; if able, he may rush to an open window, or take up an attitude on a chair which his experience has shown him is conducive to easier breathing. The face is pale and anxious, and the eyelids, lips and fingertips livid, owing to insufficient oxygenation. The breathing becomes whistling and slow, and the chest may become distended, owing to inability to expel the air. The length of the attack varies in different individuals, and the subsidence of the paroxysm is usually abrupt and somewhat unexpected.

To bring relief during the paroxysm it is necessary to remove the cause, if possible. An overloaded stomach should be treated with an emetic, and sometimes relief is obtained by administering a calomel purge followed by an enema. The breathing should be eased by free ventilation and the adoption of a suitable posture, the choice of which is best left to the patient. A whiff of chloroform

or amyl nitrite, a cup of hot, strong coffee, a dose of hot alcohol strong enough to induce a mild intoxication, the inhalation of fumes of nitre-paper, tobacco smoke, cigarettes made of stramonium, belladonna, or lobelia, or burning pastilles of the same, may produce relief in different cases. Each patient usually has some pet remedy which he has found efficacious, and it is the wisest plan to follow his wishes.

Few systems of permanent treatment seem of any avail. If the purse permits, it is generally possible to find a climate where particular individuals are free from attacks, but no general rule can be given. On the assumption that it is a nervous affection, some physicians have advocated a system of breathing drill, which consists of a slow, deep inspiration and an expiration aided by compressing the chest with the hands so as to expel all the air. In recent years psychiatric treatment has effected remarkable cures.

**Asti**, a tn. of Piedmont, in the gov. of Alexandria, Italy. It is situated on the l. b. of the Tanaro. It is an episcopal see. A feature of the city is a large Gothic cathedral. The trade in silk and woollen fabrics, hats, leather, and agric. produce is extensive. Around the tn. is a wall much dilapidated. Its wine, vino d'A., enjoys a reputation for its excellence. The hist. of the tn. goes back to 400 B.C., when it was famous for its pottery. Pop. 49,000.

**Astigmatism**, that condition of the eye in which rays of light from an object are not brought to a focus at one point. It is usually due to inequality of curvature of the meridians of the cornea. This may be caused by imperfections in the lens, unequal contraction of the muscles, or a defect in the curvature of the retina. The condition is treated by the use of cylindrical glasses with the axes arranged as determined by an oculist's test.

**Astley, Sir Jacob, Baron (1579-1652)**, a Royalist commander in the Eng. Civil war. He took part in the Thirty Years war, winning considerable distinction. He was famous for his characteristic dictum delivered as a prayer usually before battle, 'O Lord, Thou knowest how busy I must be this day. If I forget Thee, do not forget me. March on, boys!' An example of his scrupulous honesty was his refusal to take part in the second Civil war lest he should break parole.

**Astley, John (d. 1595)**, was appointed master of the jewel house on Elizabeth's accession. He was a friend of Roger Ascham, and the author of the *Art of Riding*, etc.

**Astley, Philip (1742-1814)**, b. at Newcastle-under-Lyme, England, and d. in Paris. He was well known as a horse-tamer. He began life as a cabinet-maker, but soon joined a regiment of light horse in Holland. He finally settled in London, and developed a prosperous business as circus-proprietor. The establishment was known as 'Astley's'. Dickens mentions it in *The Old Curiosity Shop*.

**Astley Bridge**, a tn. of Lancashire,

3 m. N. of Bolton, with cotton-spinning and bleaching industries. Pop. 4800.

**Astolfi**, see **AISTRUP**.

**Astolpho** is the name of an Eng. prince, one of the most famous paladins in Ariosto's poem. He was changed into myrtle by the magic of Alcina, but delivered by the fairy Melissa. Another fairy gave him a horn which caused all who heard it to flee; armed with this, he accomplished prodigious exploits.

**Astolphus, King of the Longobards (A.D. 750-746)**. He aimed at driving the Gks. from Italy; he took Ravenna, expelled the exarch, and conquered the Pentapolis, a part of the present March of Ancona. In 752 he fought against Rome, but Pope Stephen II. arranged a truce with him. A. broke the truce, but Pope Stephen was assisted by Pepin, king of the Franks, who defeated A., concluded a treaty with him, and returned to France. In 755 A. again marched against Rome, but, besieged in Pavia by Pepin, he made peace, and gave up the exarchate, which was bestowed by Pepin on the see of St. Peter.

**Aston, Sir Arthur (d. 1649)**, Royalist general. He helped to put down the Scottish rebellion. During the Civil war he fought at Edgehill and defended Reading.

**Aston, Francis William (1877-1945)**, Brit. chemist and physicist; educated at Malvern and Birmingham Univ. Worked for a few years as a research chemist in a brewery. In 1910 he went to Cambridge to work under Prof. Sir J. J. Thomson and during the First World War he was Thomson's assistant on the analysis of positive rays and neon research. In 1913 he achieved the first artificial separation of isotopes. His interest was now aroused in considering how to determine accurately the masses of atoms constituting the positive rays. But this stage in his strictly scientific work was suspended during the war period, when he worked at Farnborough on chemical problems relating to dopes for aeroplane fabrics. But discussions of the existence of isotopes satisfied him that further analysis of positive rays was the only sound method of research, and it was then that he conceived the idea of his focusing method on which foundation his subsequent success was built in measuring atomic masses and determining the prin. isotopes of all the permanent gases and the other elements which can be introduced into a gaseous discharge. These results induced chemists everywhere to reconsider the fundamental determinations of atomic weights and honours soon followed: Mackenzie Davidson medal of the Röntgen Society, 1920; Hughes medal, Royal Society, 1922; Nobel prize for chem., 1922; Paterno medal, Rome, 1923. Later he constructed a new mass-spectrograph, in which the focusing of the rays was nearly perfect. Final measurements of the desired accuracy were announced in 1927. A.'s curve of deviation from the whole number rule immediately became the basis for all speculation on the structure of the atomic nucleus. In 1935 A.



described researches by himself and other physicists which led to the discovery of 'heavy water,' a constituent in the production of the atomic bomb. In 1938 he was awarded the Royal Medal of the Royal Society for his discovery of the isotopes of non-radioactive elements. Publications include *Isotopes* (1922) and numerous papers contributed to scientific magazines.

**Aston Manor**, a municipal and parl. bor. of Warwickshire, England. Its manufs. include motor accessories, paper, and beer. It was incorporated in 1903, but the charter was annulled in 1911, when it became incorporated in the city of Birmingham. Pop. 35,600.

**Astor, John Jacob** (1763-1848), an Amer. merchant, b. near Heidelberg, Germany. During his early years he assisted his father, who was a butcher, following this vocation by piano and flute making. He emigrated to America in 1783 and settled in New York. Acting on the advice of a fur trader, he embarked on the same trade. He gradually enlarged his business, and amassed an enormous fortune. In 1811 he founded a settlement at the mouth of the Columbia R., for the purpose of establishing a central depot. It was seized by the Eng. in 1813, an event which forms the theme of Washington Irving's *Astoria*. The A. library was given by him, and forms to-day part of the New York library.

**Astor, John Jacob** (1864-1912), an Amer. capitalist, soldier, and inventor, the fourth of the name, b. at Rhinebeck, New York. He served on Gen. Morton's staff (1894-96); in the Sp.-Amer. war during the Santiago campaign (1898). He lost his life in the *Titanic* disaster of 1912. He pub. *A Journey in Other Worlds: A Roman of the Future*, 1894.

**Astor, Nancy Witcher, Viscountess** (b. 1879), wife of Viscount A. of Cliveden, whom she married in 1906. Her first husband was Robert Gould Shaw, to whom she was married in 1897 and whom she divorced in 1903. Daughter of Chiswell Dabney Langhorne of Virginia, she was born at Mirador in that state. She was the first woman to sit as a member of the Imperial House of Commons (though not the first to be elected, that honour falling to the late Countess Markievicz, a Sinn Féiner who never appeared at Westminster), being returned for Plymouth in 1919 and at every general election since that time. Has always manifested a keen interest in temperance movements. Assisted Margaret McMillan in founding the Rachel McMillan Training College. Pub. *My Two Countries* in 1923.

**Astor, Waldorf, Viscount** (of Cliveden) (b. 1879), eldest son of William Waldorf, first Lord A. M.P. for Plymouth 1910-19. Has held many subordinate ministerial posts, and did useful work as chairman of the Parl. Committee on the Prevalence of Consumption, one outcome of which was the establishment of sanatoria under the Insurance Acts. On his succeeding his father as Viscount A., his wife, Nancy Langhorne, was returned for

Plymouth. Controlled the Sunday newspaper, the *Observer*.

**Astor, William Backhouse** (1792-1875), eldest son of John Jacob, the merchant, the greater part of whose fortune he inherited and increased by real property investments. The building for the A. library, to which he gave over half a million dol., was erected under his direction. Sometimes known as the 'Landlord of New York.'

**Astor, William Waldorf, Viscount** (1848-1919), a Brit.-Amer. capitalist, b. in New York. Assumed management of the A. estates in 1871. Elected to the New York Assembly in 1877, and to the Senate in 1879. From 1882 to 1885 he was a minister to Italy, and he wrote 2 romances, *Valentino* and *Sforza*. In 1890 he succeeded to an estate valued at 200,000,000 dol. In 1893 he bought the *Pall Mall Gazette*, and founded the *Pall Mall Magazine*. In 1899 he became a Brit. subject. Subscribed large sums to various war funds. Gave £20,000 to Oxford Univ. Created a peer in 1916, and viscount in 1917.

**Astoreth**, or **Astarte**, the Gk. and Rom. name for the Phœnician Venus, whose cult is synonymous with that of Astarte, the abomination of the Sidonians (2 Kings xxiii. 13), of the Gk. Aphrodite, and of the Assyrian Ishtar. She appears to have been considered as the goddess of fertility and fruitfulness, and is typified in the form of a cow. The moon was also identified with her. The worship of A. was full of licentiousness, and is regarded in the O.T. as a type of wickedness. Her chief temples were at Erech, Nineveh, and Arbela.

**Astorga** a city of N.W. Spain, in the prov. of Leon. The Rom. name for the tn. was Asturica Augusta. Pop. 5,000.

**Astorga, Emanuele d'**, **Baron** (1680-c. 1756), an amateur singer, harpsichordist, and composer of high artistic merit. Pupil of Alessandro Scarlatti. His patron, duke of Parma, wrongly suspected an intrigue with his daughter and A. was sent to the court of Leopold, at Vienna. His masterpiece is a *Stabat Mater*, which is still famous. Composed (especially) chamber cantatas (*Cantate da Camera*).

**Astoria**, a tn. in Clatsop co., Oregon, U.S.A., at the mouth of the Columbia R. It is the oldest Amer. settlement in the Columbia valley, and takes its name from its founder, John J. Astor. Salmon tinning and lumbering are the prin. industries. Was seized by Brit. in 1813, but restored 2 years later. Pop. 10,300.

**Astrabad**, or **Asterabad**, a walled tn. in the prov. of the same name in the N. of Persia. It is situated at the foot of the Elburz Mts., and is 25 m. S.E. of the Caspian Sea. For long it was the residence of the shah's ancestors, the Kaja princes. Has a large trade in carpets. Pop. 31,000.

**Astræa**, the star-maiden in Gk. legend. A daughter of Zeus and Themis. She was the last of the goddesses to leave the earth, which she did on the advent of the Bronze Age. She is immortalised among the signs of the zodiac as Virgo.

**Astragal** (from the Gk. ἀστράγαλος), a moulding used in architecture, and usually applied to the upper end of the shaft of a column, and to its base. It is also used in the entablatures of the Rom. Doric, the Ionic, Corinthian, and Composite orders. The use of the A. is to bind the parts of columns and entablatures together, both at the top of the shaft, where the capital commences, and at the bottom where the base terminates. In Grecian architecture an example is found in the base of the Ionic temple of Minerva Polias at Priene.

**Astragalus**, a genus of plants of the order Fabaceæ. The Eng. name is milk-vetch. The best-known Brit. species is *A. hypoglottis*, the purple mt. milk-vetch, which is found at sea-level. *A. verus* and *A. gummifer* produce gum tragacanth.

**Astrakhan**, the name of a region and its cap. in the R.S.F.S.R. The pop. of the region is about 1,500,000. Its area is 91,327 sq. m. The country, watered by the Volga, consists to a large extent of brackish lagoons and steppes. The climate is hot and dry, there being practically no rainfall all summer. The yearly rainfall is 6 in., and the temp. reaches 58.9°, while the Jan. temp. is 19.0°. The chief occupation of the people is fishing; herrings, sturgeon, and caviare are exported in great quantities. Salt is extracted from the marshes of the steppes, and is one of the chief industries. A., the cap., pop. (1939) 254,000, is situated on the l. b. of the Volga. While formerly it was the only trading centre with the country beyond the Caspian, the overland routes of Orenburg and Tiflis have destroyed to some extent its monopoly, but it remains the chief centre of the fishing industry. The increase, however, in petroleum exports improved its commerce. The great markets and bazaars of A. were, before the Second World War, among the most crowded trading spots in the world. It is a picturesque city, in which mingle E. and W. On its canal are barges laden with all manner of merchandise. The city gives its name to the fur which is procured from the young Persian lamb. A. is connected by rail with Moscow (via Saratov) and with the important salt works at Lake Elton and Lake Baskunchak. Considerable quantities of oil are shipped across the Caspian to A., and thence up the Volga to the various refining centres.

**Astral Spirits**, the animating principles of the heavenly bodies according to anct. E. belief. The doctrine of the existence of such spirits was accepted by a great number of the Jews, Gks. and Roms., though such beliefs were among these peoples always looked upon with suspicion by the authorities. In mediæval times these doctrines became very widely spread. A.S. were then conceived as fallen angels, or, at least, powers who had less kinship with heaven than with hell. These spirits were intimately concerned with the affairs of mortals, and could be bound by magic to their service.

**Astringents**, remedies which cause contraction of muscular fibre and condensation of the tissues, mostly by coagulating albumin. They are used to check hæmorrhage externally or internally, and diarrhœa. The most important are tannic acid and gallic acid, the mineral acids and most metallic salts.

**Astrocrinus** (Gk. ἀστὴρ, star, κρῖνος, hair), a fossil genus of blastoid echinoderms, of family Astrocrinidæ and order Irregularæ. They are found in the carboniferous limestone of Yorkshire and Scotland.

**Astrolabe** (Gk. ἀστὴρ star, and λαβεῖν, to take), an instrument used by astrologers for taking the altitude of the heavenly bodies. As. were not only used by astrologers, but also in portable form by travellers for astronomical and topographical calculations. Chaucer in 1391 wrote a prose treatise on the A., for the use of his son. There was also another species of A. for marine calculations of the lat. Columbus used such an instrument on his voyage of discovery. See R. T. Gunther, *The Astrolabes of the World*, 1932.

**Astrolabe Bay**, a large bay on the N.E. coast of New Guinea.

**Astrology**, a science concerned with the heavenly bodies; in modern times the science is confined to the art of divination from the position of celestial bodies, but in anct. times it embraced also what is now called astronomy. Formerly the 2 depts. of the subject were distinguished thus: (1) Natural A., consisting in the calculation of the movements of the heavenly bodies. (2) Judicial A., consisting in the study of the supposed influence of the stars, etc., on human life and destiny. A., therefore, was a curious mixture of science and quackery, or rather, A. was the pseudo-science out of which the science astronomy evolved. A curious parallel is seen in the research of the mediæval alchemists, out of whose pseudo-chem. true chem. evolved. A. reached its zenith among the Babylonians—so much so that subsequently Chaldean became a synonym for astrologer. Babylonian life was in early times nomadic, and the environment was vast stretches of desert. The people had thus an unobstructed view of the heavens. From the elementary observation that the sun sustains life throughout the world developed the belief that the other heavenly bodies, too, governed nature, and were the abode of the divine element. Just as A. was being superseded by astronomy in Babylon, its influence spread westward and began to colour the thought of the Hebs., Gks., and the Roms. Thus in the N.T. we read that wise men of the E., i.e. Chaldeans, followed the star that proclaimed the advent of Jesus. Among the Gks. judicial A. never had a very firm footing, but among the Roms. it found a superstition that readily sympathised with it. The mathematici, or Chaldean astrologers, were always a source of annoyance to the authorities, and in Tacitus we read that though they were expelled from Rome repeatedly, they always returned. The nucleus round

which the science of A. grew was the belief that the divine energy was manifested in the movements of the sun and the planets. The correct interpretation of the position of these was a key to the will of heaven. Gradually the system was enlarged. The relative position of the planets and their position relative to the fixed stars and constellations gave more information. As the field of observation widened, the amount of information to be derived from the observation thereof widened with it, until it embraced every experience of human life. This information was augmented by the theory of repeated omens, e.g. the postulation that if a certain event happened while a certain planet occupied a certain position, the recurrences of that position of the planet would also foreshadow a recurrence of the event. The reaches of astrological information were also extended by the association of ideas. The divers planets were associated with various passions and things, and the position of the planets would therefore denote a state of the passions, etc., with which they were associated. To take a concrete example, Mars is associated with war and strife, and Venus with love; the juxtaposition of the 2 planets might therefore indicate some calamity arising out of some union. Moreover, these planets were associated with the various parts of the human body, hence medicine became a department of A. Thus Mars, as being the tempestuous planet, became associated with the bile. Again, not only the position of the planet was important, but which particular sign of the zodiac it occupied, or, in other words, which house of heaven. The days of the week were assigned to the various planets, etc.—Sunday to the sun, Monday to the moon, Tuesday to Mars, Wednesday to Mercury, Thursday to Jupiter, Friday to Venus, Saturday to Saturn. (These relations are more immediately apparent from the Fr. names of the days of the week.) In the Middle Ages the astrologer was considered by many people of learning and dignity, as well as by the uneducated as being almost omniscient. The astrologer could foretell the destiny of the individual by calculating which star was in the ascendant at the time of his birth. The ascendant was that sign of the zodiac which was nearest the E. horizon at the time of the event, and that star was most important which rose at that precise moment, i.e. was in the ascendant. Limitless information could thus be derived from these details regarding the character, physique, and destiny of the individual. The art of A. has not yet died out, though for long it has been in ill repute. In recent years, as with other occult sciences, attempts have been made to revive it on scientific principles. However, whether A. will do further services to mankind in the future, time alone can decide, but its services to mankind in the past are undeniable, despite the bad reputation the art has earned in modern times, for it was out of A. that the great science of astronomy evolved.

**Astronomer Royal**, the head of Greenwich Observatory, appointed by the Prime Minister under the royal sign-manual. The office was estab. in 1675, and from 1933 to 1936 was held by Sir Frank Dyson (d. 1939), formerly A. R. for Scotland and director of the Edinburgh Royal Observatory. The present A. R. at Greenwich is Sir Howard Spencer Jones (author of *General Astronomy*, 1922).

**Astronomy** (Gk. *ἀστρον*, a star, *νόμος*, law) is the science which treats of the heavenly bodies and all phenomena therewith connected. Such phenomena include their movement in the sky, eclipses arising therefrom, their influence on the earth and on each other, and changes in their composition. A. is the oldest, most exact, and most widely embracing of all the sciences, and, as the great Laplace truly said, presents the longest chain of discoveries. A. rising in the mists of antiquity, attained to the position of an exact science under the Gks., but during their time, and for many centuries after, it was closely allied to, if not almost overlaid by, the pseudo-science of astrology. However, with the revival of learning in the sixteenth century and the crowding discoveries which resulted from the invention of the telescope at the beginning of the seventeenth, A. was able to slough its astrological covering even as chem. arose from alchemy. A. in modern times has been generally divided into 3 main divs., known as (1) practical, (2) theoretical, and (3) physical. The first deals with the observation of the celestial objects, and necessarily therefore concerns itself with the instruments and observatories used in this work. The second, or theoretical A., is practically a branch of higher mathematics, and is the application of the fundamental laws of gravitation to the observations of the practical branch. The third branch of the science, the physical, trenches on the domain of chem., and is the application of the other, and by comparison, terrestrial, sciences to the heavenly bodies. This branch of the subject is the most recent in date, but of great and increasing importance, and serving to weld into one harmonious whole all the sciences. Each of these 3 main divs. has its sub-divs. according to the nature of the celestial object observed, or the instrument used. The known heavenly bodies are the sun, the moon, the planets, the satellites (or moons) of the planets, the asteroids (small planets), meteors (shooting stars), and comets, all of which belong to what is known as the solar system, and the bodies immeasurably more remote, the stars and nebulae. The 4 chief instruments used in observations are: (1) Fixed telescopes, graduated for ascertaining the position of the heavenly bodies on the celestial sphere; (2) equatorially mounted and movable telescopes, capable of following the movements of the heavenly objects; (3) the spectroscopic, for ascertaining the physical composition of the body observed; and (4) the photographic camera, for securing a permanent and trustworthy record of celestial objects too faint to be

perceived by even the optically assisted human eye. These sub-divs. have their special names and their practical, theoretical, and physical sides. What is known as solar physics is the study of the sun's physical condition; the mapping of the moon's surface is known as selenography; and the name sidereal A. attaches to the special study of nebulae and the so-called fixed stars.

From the foregoing paragraph it will be seen how vast is the subject we have to deal with. It is impossible in this article to give more than an outline of the science, and, in the main, a chronological record of discoveries. For details the reader is referred to the articles on the different categories of heavenly bodies, the instruments used, and the names of constellations and astronomers. The prin. articles are as follow: ALTITUDE; ASCENSION, RIGHT; ASTEROIDS; AZIMUTH; IRABE; COMET; CONSTELLATION (*see also under various names*); COPERNICUS; DAY; EARTH; ECLIPSE; ECLIPTIC; EQUINOXES; GALAXY; GALILEO; GRAVITATION; HERSCHEL; HIPPARCHUS; HORIZON; KEPLER; LAPLACE; LATITUDE AND LONGITUDE; LIGHT; MERIDIAN; METEORS; MOON; NEBULÆ; NEWTON; OBSERVATORY; OCCULTATION; OPTICS; ORBIT; PARALLAX; PERTURBATIONS; PHASES; PHOTOGRAPHY; PLANETS (*see also under various names*); POLES; PRECESSION; PTOLEMY; REFLECTION; SATELLITES; SEASONS; SEXTANT; SOLAR SYSTEM; SOLSTICE; SPECTRUM AND SPECTROSCOPE; STARS; SUN; TELESCOPES; TIDES; TRANSIT INSTRUMENT; YEAR; ZODIAC.

Before turning to the hist. of A. it will be well to take a brief glance at the position of the earth in the solar system, and of that system in the universe. In the course of the last 20 years our knowledge of the universe has been increased enormously, especially with regard to the origin of the stars, their composition, their histories, their sizes, and their temps. The science of astrophysics has brought about this enlightenment, and an attempt is made, in what follows, to describe the results of the recent progress, made possible only by new methods of attack and by great improvements in the design and technique of astronomical instruments. The centre of research has shifted from the solar system, but we must briefly remark on that system, and refer the reader for further details to the articles on PLANETS, COMET, and METEOR. The solar system is supposed to have had its origin in the approach of another sun to our present sun: the gravitational attraction between 2 such bodies would be enormous, and just as our small satellite, the moon, causes tidal waves in our oceans, so the approaching sun caused great tidal waves in our sun, and streams of matter were ejected from it. This matter rotated round its parent and in the course of time condensations took place which served as nuclei for the building up of the planets, which continued, and now continue, to rotate round the sun at different distances from it. Kepler and

Newton (*qq.v.*) studied their orbits and pronounced the laws which govern their motion.

There are 8 major planets, and more than a thousand known minor planets or asteroids (*qq.v.*). The solar system consists of the central star or the sun, with the planets and their attendant satellites, and, in addition to these, there are meteors and comets. Named in the order of their distances from the sun, the major planets are Mercury, Venus, the Earth, Mars, Jupiter, Saturn, Uranus, and Neptune; the asteroids lie between Mars and Jupiter. The Gks. gave them the name wanderers (Gk. *πλανῆς*, a wanderer). All the planets shine by the light they reflect from the sun, and they describe approximately circular orbits about it. The orbits are really elliptical, and the sun is in one focus of the ellipsis. They rotate in the same direction round the sun, and their orbits lie in approximately the same plane. The period of rotation varies in the year of the planet, Mercury's being only 88 days, as compared with our 365½ days. In addition to this rotation, the planets turn on their axes, and it is this which causes our seasons.

The mean distance of the Earth from the sun is 93,000,000 miles; Mercury is about 37,000,000 miles from the sun, while the furthest planet, Neptune, is about 280,000,000 miles from its parent. Conditions such as temp. and the nature of the atmosphere of the planets depend on their dists. as well as on their positions with respect to the sun; there is only a possibility of life such as we know it on the planet Mars, the remaining planets are either too hot or too cold or devoid of an atmosphere capable of supporting life.

The Earth is approximately a sphere, nearly 8000 m. in diameter, the sun is more than a million times as large. It is our nearest star, and yet it is exceedingly small by comparison with the giant stars known to us. The giant known as Betelgeuse, the bright red star in the constellation of Orion, is so great that if it replaced our sun, it would more than fill the whole of the space between the Earth and the sun. Some idea of its magnitude may be gathered from the fact that if a bullet could travel with undiminished speed round the Equator of Betelgeuse, it would take nearly 60 years to return to its starting point. Its apparent size is small because it is so far away from the Earth, namely 600 light-years away. Light travels at a speed of 186,000 m. per sec., and takes rather more than 8 min. to travel from the sun to us; by one light-year we mean the distance that light would travel in 1 year, i.e. nearly 6 billion miles. When we look at Betelgeuse we see it as it was 600 years ago: we are, as it were, looking back into the past, but it is less irksome to think of the distances of the stars in terms of light-years! There are at least 3000 million stars, and, with the exception of the sun, which is about 8 light-mn. away, the nearest one is Proxima Centauri, 4·1 light-years away, while we know of globular

clusters of stars which are 220,000 light-years away from the Earth.

Modern A. has realised that what the ancients called the fixed stars are not fixed, but most with velocities much greater than that of our sun; though the constellation of Orion appears to the naked eye to be in the same position it occupied 1000 years ago, the stars are really moving quickly, and it is merely because they are so very far away from us that they appear to be fixed. In addition to the stars, there are nebular regions in the stellar universe, e.g. the Milky Way (on which see NEBULA); it is sufficient to point out here that the present view is that the evolution of the star begins in some nebula and the star that condenses from the nebula is a diffuse mass of gas of low density and comparatively low surface temperature (3000° C.). According to the classification of the Harvard Observatory, the star is now a red giant of type M, e.g. Betelgeuse. The evolution of the star through the successive stages known as M, K, G, F, A, B and characterised by typical differences of spectra, is accompanied by increase of temp. and a contraction of mass, so that when type B is reached, e.g. Sirius, the surface temperature is about 20,000° C. and the density still somewhat less than that of water. The giant has now entered dwarfdom, and it begins to cool as it contracts further, and it goes through the same spectral stages in the reverse order, though it is now called a dwarf, because it is much smaller than the giant which emits the corresponding type of spectrum. Our sun is a dwarf star of type G, with a surface temperature of 6000° C. It has still to pass through the K and M stages before its life as a star is completed. The density of a dwarf increases with its age, and there are stars so dense that a tiny portion of no more than the bulk of a match-box weighs as much as a ton. The evolution of the stars is a slow process, and we cannot accept anything less than 1000 million years for the age of the sun. About three-quarters of the stars are dwarfs, and one quarter are giants, progressing towards their maximum temperature. This surface temperature is very small by comparison with that of the star's interior temperature, which is about 40,000,000° C.

**Binary stars and pulsating stars.** Many stars which appear single to the naked eye are found to be double stars when examined in a telescope or by the spectroscopic. These stars are known as binaries, and consist of 2 stars revolving in orbits about their common centre of gravity. Much of our recent knowledge of the stellar universe is due to the pulsating stars known as Cepheid variables. Although Michelson in 1920 constructed his telescopic interferometer, and by means of it measured the diameter of Betelgeuse, few stars appear large enough to the terrestrial observer to be measured in this way. The star  $\delta$  Cephei is a prototype of stars that occur in all parts of the universe, known as Cepheid

variables. They are globes which swell and contract in a period of  $5\frac{1}{2}$  days, and their pulsations are made known by the corresponding changes in their luminosities. Now, as Eddington points out, the note of a tuning-fork is characteristic of the fork, and in a similar way the period  $5\frac{1}{2}$  days is characteristic of stars of identical structure and luminosities. The Cepheid variables therefore serve to measure the distances of various parts of the stellar universe, by comparing the apparent luminosity of any Cepheid star with that of a near star of the same type whose distance can be measured by finding its parallax (q.v.). The realisation of this fact has enabled astronomers to 'measure up' the universe in no uncertain manner.

We have had, so to speak, a bird's-eye view of the solar system, and have the universe in perspective. We are now in a position to appreciate the hist. of astronomical discovery, which, as has been indicated, is also largely the hist. of the invention of the instruments used and the progress of mathematics. We cannot here make more than a passing allusion to the influence of the discoveries of the astronomer on the mind of man and their reaction on philosopher, theologian, geologist, physicist, and chemist, and must content ourselves by observing that their effect has been profound.

A. is, as we have said, the most ancient of the sciences. Nations who are known to have cultivated it before the Christian era are the Chinese, Hindus, Chaldeans, Egyptians, and Gks. The Chinese made it a matter of politics, the next three of religion, and all, except the Gks., applied it to astrology. With the Gks. A. was treated merely as any other science, and for this reason, perhaps, it made a more rapid advance with them than among their contemporaries. Which nation was the first to study A. will perhaps never be finally determined: all we can say is, that wherever a people emerged from savagery, traces can be found of astronomical observations. For each of the above-mentioned nations the claim is made for the honour of being the first to study the science. The Chinese annals go back as far as 2857 B.C., but of astronomical phenomena they record hardly anything except the eclipses of the sun and the appearance of comets. The fact of the motions of the planets was known to the Chinese, as was also the Metonic cycle, but not the precession of the equinoxes till about A.D. 400, or about 550 years after its discovery by the Gk. astronomer Hipparchus. A record of the conjunction of 5 planets shows that observations were made by the Chinese at about 2500 B.C. The burning by order of the Emperor Tsin-Chi-Hong-Ti (221 B.C.) of all scientific books may have destroyed evidence of still further astronomical observations. Neither the Hindus nor the Egyptians contributed to A. anything of outstanding importance, but from the accuracy with which the Great Pyramid of Cheops faces the cardinal points it is clear that the Egyptians possessed, even

at the most remote period no little astronomical knowledge. But it is probable that the Chaldeans were the nation which, next to the Gks., made the most extensive study of the heavens. Certain it is that they had the Metonic cycle, and it is thought that Meton, the Gk. astronomer of the fifth century B.C., who gives his name to this period, may have obtained the cycle from them. They had quite early in their hist. measured the celestial sphere and portioned out and named the sections (signs) of the belt of the heavens through which the sun, moon, and planets apparently move, a belt known as the zodiac. Though their observations never attained to the accuracy of the Gks., being, in fact, of the roughest kind (the time of eclipses, for instance, being given only in hrs., and the part of the diameter eclipsed only within a quarter), they were, nevertheless, the earliest trustworthy observations, and in the hands of Hailey, an Eng. astronomer, led to the discovery of the acceleration of the moon's mean motion. Besides Meton's, these Babylonian astronomers also discovered other cycles, among them being the Saros, i.e. the period of 18 years 7 months after the effluxion of which eclipses of sun and moon will again occur at the same intervals. It is not certain when the Saros was discovered, but it is probable that it was some centuries before the Christian era, and the earliest eclipse (excluding doubtful Chinese accounts) as one referred to on a Babylonian tablet as having occurred in 1062 B.C. Simplicius, a commentator on Aristotle, tells us that Alexander the Great found records in Babylon containing observations of eclipses for nearly 2000 years prior to the conquest of that city by him. These he transmitted to his former tutor Aristotle, but Ptolemy, the great astronomer of the Alexandrian school, mentions only a few of them, and none prior to 720. But undoubtedly among the Chaldeans A. was gathering a definite shape, and among the instruments they used we find the use of the clepsydra (water clock) as a clock, and of the gnomon as measuring solstices.

To the Gks., who took the lead in the ant. world in so many other matters, must go the honour of raising A. to the dignity of an exact science. From Thales (640 B.C.) to Hipparchus (190-120 B.C.) was built up a wonderful body of exact astronomical knowledge which for 15 centuries was not appreciably added to. Thales, who founded the Ionian or physical school of philosophy, and one of the Seven Wise Men, predicted the eclipse of the sun which happened in 584 B.C. in the reign of Alyattes. He may be said to be the founder of Gk. A., but for many reasons we shall reserve for Hipparchus the title of Father of A. It is probable that Thales in predicting the solar eclipse did so by means of the Chaldean Saros (mentioned above). He also held, and is the first of whom we have record of so holding, that the earth was a sphere, that the stars were fiery bodies, and he also taught his countrymen how

to steer their vessels by means of the Little Bear, an asterism nearer the Pole star than the Great Bear, which the Gks. had hitherto been satisfied with as an indication of the N. Anaximander, his successor, is credited with asserting that the earth rotated on its axis, and that moonlight was but reflected sunlight. Pythagoras (500 B.C.) promulgated the idea, which was not generally accepted till many centuries afterwards, that the earth and other planets circulated round the sun. He also was probably the first to teach that the evening and morning star were the same planet. Meton (432 B.C.), already mentioned, introduced the cycle bearing his name, which Calippus, 100 years later, improved. Eudoxus of Cnidos (370 B.C.), according to Pliny, brought the year of 365½ days into Greece, and wrote some astronomical works. Aristotle (384-322 B.C.), perhaps the greatest all-round scientist among the ancients, wrote on A., but his works were lost. We know, however, that he gave a correct interpretation of the phases of the moon. The fourth century B.C. saw the foundation at Alexandria of the school of that name. The Alexandrian astronomers were encouraged in their task by the Ptolemaic dynasty. Their work was characterised not so much by new theories of discoveries, as by a long series of painstaking, connected, and accurate observations. They no doubt owed much to Euclid of Alexandria (300 B.C.), who did so much to advance the trigonometrical science by which astronomical calculations are made. Among the more distinguished representatives of this school were Timochares and Aristyllus (c. 300 B.C.), who made observations which enabled Hipparchus to discover the precession of the equinoxes. Eratosthenes, who was librarian at Alexandria (276-196 B.C.), attempted to ascertain the size of the earth—and roughly succeeded—by means of measuring an arc of the meridian between Alexandria and Syene in Lower Egypt. He made other useful observations, such as the determination of the value of the obliquity of the ecliptic, a value adopted by his 2 great successors, Hipparchus and Ptolemy.

Hipparchus was not merely the greatest of the Gk. astronomers, but one of the greatest of all astronomers. He was b. at Nicæa in Bithynia, either in 190 B.C. or in 180 B.C., lived at Rhodes, and d. 120 B.C. In his youth he wrote a commentary on a poetical description of the stars by Aratus, and this is the only direct knowledge we have of him. To his great successor and only rival in fame among the ancients, Ptolemy, we are indebted for what we know of his discoveries. As said above, he discovered the precession of the equinoxes by a comparison of his own observations with those of Timochares and Aristyllus. He was a great mathematician, and it was he who first employed processes analogous to those of plane and spherical trigonometry, for which he constructed a table of chords. He determined the mean motion of the sun and of its apogee, the inequality of

the sun's motion, and the length of the year to greater exactness than his predecessors. He found the mean motion of the moon, of her nodes, and of her apogee; her parallax, eccentricity, the equation of her centre, and the inclination of her orbit. His observations also led him to suspect another inequality in the moon's motion. This was the 'evection' afterwards discovered by Ptolemy. He made one of the first steps towards the correct representation of astronomical phenomena, by supposing the sun to move round the earth in a circle, the earth not being at the centre. He was, of course, incorrect as to which body moved round the other, but he was reaching forward to the correct description of celestial motion, i.e. the ellipse. He made a catalogue of 1081 stars, giving their lat. and long. We can judge of the value of his work by the statement which has been made that had Hipparchus possessed the pendulum and the telescope, 50 years might have enabled his successors to place A. in the state in which it stood at the birth of Newton (1642). Considering his means, his observations are perhaps unequalled, and he well earns the title of Father of A. After the death of Hipparchus there is no astronomer of eminence till Ptolemy. Probably there were many real observers, but the loss of even their names, and the silence of Ptolemy himself, makes it clear that no discovery of any importance was made. It is not a little remarkable that Rom. civilisation, which was at its height in the period between Hipparchus and Ptolemy, should have produced, neither then nor at any time, any astronomers of more than mediocre quality. One must, however, mention the name of Sosigenes of Alexandria, who advised and assisted Julius Caesar to reform the calendar, the calendar which, after being slightly revised by Pope Gregory XIII., is in use to-day.

We now come to the second great name among ant. astronomers, Ptolemy, who fl. in Alexandria towards the middle of the second century of our era. Next to Hipparchus he was probably the greatest of the ant. astronomers, and with his death the epoch of ant. A. terminates. Just as Aristotle in natural science and philosophy dominated learning during the Middle Ages, so Ptolemy in A., and incidentally, we may say, in geography, held supreme sway over scientific men from his own time down to the sixteenth century. Finally, although he did not originate it, he was the chief exponent of and gave his name to the system of planetary motions known for centuries as the Ptolemaic system. His chief title to fame is that he corrected and improved on the work of his predecessors, particularly Hipparchus, but he made sev. original discoveries of very great importance. A voluminous writer on many subjects, his astronomical work, the *Almagest* (q.v.), summed up practically all the astronomical knowledge of the ants. and it is, in fact, practically our chief source of information on this subject. The prin. discovery of Ptolemy is

that of the 'evection' of the moon, an inequality such as would be caused by an alternate increase and diminution of the eccentricity of the moon's orbit. He also discovered the refraction, and made some tolerably correct experiments to determine its law, explaining the apparent enlargement of the disks of the sun and moon when near the horizon. The projection of the sphere of Hipparchus he extended, and, in fact, entered into the investigation of every point which Hipparchus had touched, verifying or altering. He attempted to account for the motions of the planets by supposing them to move uniformly in circles, the centres of which circles themselves moved uniformly round the earth. The whole Ptolemaic system is now on the scientific scrap-heap, but for his painstaking work as an observer and as the historian of A. the name of Ptolemy will always be honourably remembered.

With Ptolemy the originality of the Gk. school ends, as indeed does all of ant. astronomical science. With the rise of Christianity and the descent of the northern barbarians on the shores of the Mediterranean, civilisation suffered an eclipse. A dense pall of scientific ignorance hung over Europe, and in such congenial environment the bastard sciences of alchemy and astrology flourished. But in its darkest hour science has never lacked devotees, though for a while it may harbour in strange households. The sacred torch of scientific truth was kept alight by the Arabs—an Asiatic and non-Christian people. It is no part of our duty here to animadvert on the dislike, to put it mildly, of A. evinced by the more fanatical of the Christians from the time of Hypatia (end of fourth century A.D.) to that of Galileo (seventeenth century). We mention these 2 cases in passing because the first-named lived in the period immediately succeeding Ptolemy, and is, moreover, worthy of mention as being the first woman astronomer and mathematician on record. With Galileo the Dark Ages ceased and practical modern A. commenced. But of him we will speak later.

The E. and Cordova caliphs were for the most part generous patrons of learning. By their encouragement of original scientific research and of translation into Arabic of the works of the old Gk. authors, and by, in some cases, actual personal labour in this field of knowledge, the caliphs have earned an honourable position among enlightened princes. The line of Arabic astronomers may be said to have begun in the reign of Al-Mansur, the caliph who built Bagdad, in the year A.D. 762. In his reign were begun translations of the Gk. writers, and with nearly the same instruments, and the same theory, as Ptolemy, commenced a period of 4 centuries of astronomical observation. In the reigns of the great caliph Harun al-Rashid and his son Al-Mamun, both of whom were students of the science, great encouragement was given to A. The most illustrious of this school was Albategnius, or Al-Battani

(A.D. 880), and he is, beyond all doubt, the only distinguished observer of whom we know anything between Hipparchus and Tycho Brahé. He discovered the motion of the solar apogee, corrected the value of the precession, the solar eccentricity, and the obliquity of the ecliptics. He pub. tables, was the first to use sines (instead of chords) and versed sines, and found the length of the year more accurately. The influence of the Arabian school spread to Persia, Turkestan, China, and Spain as Islam advanced on its conquering mission in these countries. In Persia in the eleventh century flourished the famous astronomer-poet, Omar Khayyám. He suggested a reformation of the calendar, which, though not adopted, was, it has been asserted, more accurate than that of Pope Gregory XIII. Ulug Beg (1433), a prince at Samarcand, pub. the most correct catalogue of stars known till his day, but, on the whole, though assiduous observers and great mathematicians, there was little constructive work in the Arabian school.

The names of 4 great men will be for ever associated with the beginnings of modern A.: Copernicus and Tycho Brahé (sixteenth century), Kepler and Galileo (seventeenth century). The achievements of these 4 men stand up like peaks, and dwarf all the efforts of their immediate predecessors. With these predecessors we have not space to deal, so must content ourselves with remarking that with the Renaissance, A. was reintroduced into Europe. The Gk. writers were trans. direct, but more often than not their writings filtered through translations from the Arabic. The first translation of the *Almagest* of Ptolemy was made under the auspices of the Emperor Frederic II., about A.D. 1230, and many original Arabic works on mathematics were trans., the latter introducing into Europe algebra and the decimal fractions.

Nicolas Copernicus, sometimes called the founder of modern A., was b. on Feb. 19, 1473, at Thorn in W. Prussia. In his almost posthumously pub. book, *De Revolutionibus* (it appeared a few hrs. before his death), Copernicus laid down 2 propositions. With the anc. Gks. of the Pythagorean school he asserted that the diurnal movement of the stars, etc., was apparent only, and resulted from the rotation of the earth about its axis in the opposite direction. He also held that the earth was one of the planets, and, like them, revolved round the sun. These, of course, are to-day the commonplaces of A., but in his time practically every scientific man believed that the earth was the hub of the universe. Copernicus was in error in describing the motion of the planets as circular, instead, as Kepler later found to be the case, elliptical, and his book is a curious mixture of his own original and sagacious notions and of the old philosophy, such as that the planets moved in crystal spheres. His system, to which his name is attached, did not at first make great headway. It encountered the odium *theologicum* of his immediate suc-

cessors, and it needed the thought of Kepler and the application of the newly invented telescope to A. by Galileo, added to, still later, the discovery of the laws of gravitation by Sir Isaac Newton, to establish finally the Copernican system. What perhaps hindered the general acceptance of the Copernican system more than theological dislike or the inertia of the human mind was the fact that the second of our quartet of giants, Tycho Brahé (1546-1601), the greatest practical astronomer of his time, constructed yet another planetary system, a blend of the Ptolemaic and Copernican, which held together against the weak and ineffective criticisms of the Copernicans better than the Ptolemaic system. The system of Tycho consists in supposing (1) that the stars all move round the earth as in the Ptolemaic system; (2) that all the planets, except the earth, move round the sun, as in the Copernican system; and (3) that the sun, and the imaginary orbits in which the planets are moving, are carried round the earth. From his observation of comets he pointed out that the *spheres* of the planets could not be solid, since they were cut in all directions by the orbits of comets. And Tycho was the first to prove that comets had such a parallax as precluded their being atmospheric or even sublunary bodies. By his demolition of the crystal planetary spheres he dealt a severe blow, the first decisive blow, to received notions, and at the same time that he damaged the Ptolemaic structure he weakened the Copernicans' arguments, for the Copernicans of that time, having no inkling of the law of gravitation, had adopted the anc. idea of crystal spheres, in which the planets were embedded, revolving round the sun. Tycho has been reproached for not adopting the more simple Copernican system, but it must be remembered that the Tychoenic system explained all appearances as well as that of Copernicus, and, in fact, while it seized by far the greater proportion of the advantages of the latter, it was not open to the most material objections. We must also bear in mind that Tycho was the last great astronomer without the help of the telescope, and that the other confirmatory sciences were in his day most crude. The most stupid general can win a battle if his opponent be more stupid, and of all the inconclusive arguments of that day, the reply of the Copernicans to Tycho was the most inconclusive. The Copernican system appears a premature birth; the infant long remained sickly and would certainly have died if it had not fallen under better management than that of its own parents.

But this aberration apart, the work of Tycho Brahé was of a most solid and accurate nature, and furnished the means by which the Ptolemaic and Tychoenic systems were finally destroyed. He made a catalogue of the fixed stars, more accurate than any which preceded, and he greatly improved and extended the instruments in use as well as all methods of observation. The celebrated Kepler, who



helped to demolish Tycho's system, was for the last 2 years of Tycho's life his colleague in his work. It was with Tycho's accurate observations to work upon, and following Tycho's much-needed advice to apply himself to the deduction of causes from phenomena, that Kepler made his marvellous discoveries.

Unlike his master, Kepler (1571-1630) was a Copernican. In addition to A., he studied and made some discoveries in optics and physics, but it is chiefly as a mathematician that Kepler excelled. Too much importance cannot be attached to his 3 laws of planetary motions, laws which, though not proved till Newton's *Principia* appeared many years later, laid securely the foundations of modern A. Like all great things, Kepler's laws are in essence marvellously simple, and, like simple fundamentals, are beautiful. As the geometrician derives pleasure from the contemplation of, say, Euclid's 47th proposition (Book 1), 'Theorem of Pythagoras,' so the astronomer feels a pleasurable emotion by allowing his mind to dwell on Kepler's third law. The first 2 laws were announced in Kepler's work, *The Motions of Mars*, pub. in 1609, and the third in his *Harmonice Mundi*, 1619. The laws are as follows: (1) *The planets move in ellipses, having the sun in a focus.* (2) *The imaginary straight line joining a planet to the sun (radius vector) sweeps out equal areas in equal times.* (3) *The square of the time of revolution of any planet about the sun is proportional to the cube of its mean distance from the sun.*

In the hands of Galileo Galilei (1564-1642), or, as he is more generally known by his Christian name alone, Galileo, the telescope settled the problem of the planetary system. Galileo, a great astronomer, was nevertheless more than an astronomer, and may be said to have invented the science of dynamics. Quite early in life (1581) he discovered the isochronisms of the pendulum, an invaluable principle which led to the more accurate construction of clocks. In 1609 Galileo made a telescope from a general description of a magnifying instrument made by one Jansen in Holland. He was indubitably the first to apply the telescope to A., and on the very first time that he used it he discovered 3 of the satellites of Jupiter (Jan. 7, 1610). A few nights later he discovered a fourth moon to Jupiter. In the same year he saw spots on the moon (mts., etc.), resolved the Milky Way into stars, discovered the rings of Saturn and the phases of Venus. The following year he observed sun-spots, and from them concluded that the sun rotated on its axis. None of these observations required a great amount of skill, and all the phenomena mentioned may be easily observed by any amateur with a small telescope, but they served to bring down with a run the fast-crumbling fabric of the Ptolemaic system. For it was an obvious analogy to make, that if the sun rotated on its axis, why not the earth? If Jupiter could carry his 4 moons along

with him round the sun, why could not the earth carry its moon? And, moreover, the resemblance between the phases of Venus and the moon was yet one more argument in favour of the Copernican theory. For further details of the life and discovery of this most interesting man the reader is referred to the article GALILEO. Therein he will find food for reflection on the age-long struggle between science and sacerdotalism.

It will not be necessary to emphasise the profound change that came over A. with the introduction of the telescope. Even with the small light-grasping power of the primitive instrument of Galileo the whole face of the heavens was altered and it was only a matter of time until the continued improvement of this wonderful instrument should, as it were, induce the universe to yield up more and more of its secrets. But for a long while the telescope was a small instrument and suffered from the defect of being chromatic. This defect was remedied by Dollond, an Eng. optician, in 1758, but till his day the largest *refracting* telescope did not have an object glass of a greater diameter than 3½ in., a size which scores of astronomical amateurs possess to-day. The search for a form of telescope that would obviate the drawbacks of chromatic light led to the invention of the reflecting telescope; the Gregorian by Gregory in 1663, and the Newtonian by Sir Isaac Newton in 1669. As the mirror of the reflecting telescope offered less difficulty in construction, and was consequently cheaper, for a long time much more progress was made with the reflector than with the refractor. In 1723 Hadley had made a reflector with a mirror of 5½ in., but it was Sir William Herschel (1738-1822) who made telescopes with mirrors ranging from 6 in. to 4 ft. The largest reflector yet made was that constructed by Lord Rosse, who in 1848 constructed one of 6 ft. diameter and with a focal length of 53 ft. The 2 largest refracting telescopes are both in America. That of the Lick Observatory has a 36-in. aperture, and that of the Yerkes Observatory one of 40 in. The progressive increase in the size of the telescope has enabled the surface of the sun, moon, and planets to be surveyed in a more and more detailed manner. It enabled Cassini in 1631 to observe for the first time the transit of Mercury over the sun's disk, and to measure the diameter of Mercury. Eight years later Horrocks and Crabtree first observed a transit of Venus over the disk of the sun, and the former ascertained the diameter of that planet. The telescope enabled Cassini in 1665 to determine the time of the rotation of Jupiter, and in the following year he determined the rotation of Mars and made a first approximation to that of Venus. In 1675 Roemer discovered the velocity of light from observations of Jupiter's satellites (a discovery since confirmed by other means in the physical laboratory), and the same year saw the founding of the world-famous Greenwich Observatory, with Flamsteed

as first astronomer royal. The first transit telescope was used by Römer in 1689, 2 years after the publication of Newton's *Principia*. In this epoch-making work Newton provided the mathematical proof of Kepler's laws and laid down the law of gravitation. It is, of course, too technical a matter to enter into here. 1705 was the year in which Halley first predicted the return of the comet to which his name has been given, and it duly turned up again in 1758, the year predicted. Flamsteed's great work, *Historia Cœlestis*, issued in 1725, made a great step forward in sidereal A., giving a catalogue of the stars such as had never before been pub. Sir William Herschel is, however, generally spoken of as the founder of sidereal A., his motto being 'Whatever shines should be observed.' With his giant reflecting telescopes he undertook a complete survey of the stars in the N. hemisphere, in the course of which he found the planet Uranus, 1781. The story of the observation of the stars in the S. hemisphere is bound up with that of his son, Sir John Herschel, and his son's forerunner, Lacaille. The latter, a Fr. astronomer, went to the Cape of Good Hope in 1751, and he remained there 4 years. He observed nearly 10,000 stars and formed 14 new constellations. Sir John Herschel, carrying on the work of Lacaille, did for the S. hemisphere what his father had done for the N., and pub. in 1847 a complete survey of the S. heavens. The first few minor planets (asteroids) were discovered in the first decade of the nineteenth century, and the planet Neptune in 1846.

By the middle of the nineteenth century the position of A. stood thus. The whole surface of the sky had been carefully surveyed, and catalogues prepared giving thousands of stars and scores of nebulae. The solar system was known as we now know it except for the discovery of a few small satellites and additions to the swarm of minor planets. The motions of all heavenly bodies were referable to the laws of gravitation, enunciated by Kepler and elaborated by Newton and Laplace. Large and accurate telescopes were in existence for examining the surface of sun, moon, and planets, and many of their features had been recorded. Observational A. was beginning to yield fewer results. How great a progress had been made in telescope construction may be judged from the statement of the former astronomer royal (Sir Frank Dyson's *Astronomy*) that the moon could be seen through modern telescopes as it would appear to the naked eye at a distance of 200 m. At this distance a circle a mile and a half in diameter would appear as large as the whole moon does to the naked eye at its distance of 240,000 m., so that towns, lakes, etc., if they existed on the moon could be distinguished. What, then, would be the line of advance for the latter-day astronomer? The answer is that he turned his attention to the sidereal universe and to an examination

of the composition of the heavenly bodies.

The dictum of the biologist, 'Want creates organ,' applies here. The need for instruments to aid man in his self-appointed task of plumbing the universe resulted in the application of the spectroscopic and the photographic camera to astronomical uses. The chemist came to the aid of A. with his sensitive photographic plates and knowledge of the spectra of earthly elements, and the astronomer repaid his brother scientist by his discovery of new elements in the sun: elements unknown to mundane chem. For a more detailed account of celestial and terrestrial spectroscopy the reader is referred to article SPECTRUM AND SPECTROSCOPE: it will suffice here to explain the principle of the spectrum. Light is capable of being split up into component parts in the same way as sound. If we hear a band playing, our ears are able to distinguish the notes of the trumpet, horn, bassoon, violin, double bass, clarinet, and so forth, though all these instruments are being played simultaneously. In like manner, a beam of light if passed through a glass prism will be split up into a band of multi-coloured light, ranging from violet at one end to red at the other, the colours shading into each other by insensible gradations. These colours correspond to the length of the vibrations of the light waves and the time of vibration, and as these different vibrations are produced by the light emitted by the various chemical elements in a state of combustion, we are enabled by this means to tell roughly the composition of the luminous body. If we still further expand the band of light by passing it through one or two more prisms, we find on careful examination that it is generally crossed by a number of bright or dark lines. Each of these lines stands for an element in combustion, and the lines produced by that element are always in the same position on the spectrum. Thus the spectrum of common salt shows 2 bright yellow lines, and no matter in what part of the universe (sun, earth, or stars), common salt, if in a state of combustion sufficient to produce light, will always show these 2 bright yellow lines in the same position, or, what amounts to the same thing, 2 dark bands in the same position. The discovery of this fact by Fraunhofer and the development of this discovery by Kirchhoff laid the basis of solar and stellar chemistry. By this means we can tell the physical construction of every luminous body in the universe, whether it be sun, star, comet, nebula, or meteor. And as the spectrum is susceptible of being photographed, and as the photographic plate can record the ultra-violet light not visible to the human eye, great accuracy can be observed in these observations.

Another remarkable result is obtained from spectrum analysis: We have seen how the lines on the spectrum show the composition of the body emitting light, but another feature of the spectroscopic of equal, if not surpassing, importance

to the astronomer is that known as Doppler's principle. This principle enables the motion and direction of the light-emitting body to be measured. According to the number of light vibrations per sec. the position of a line in the spectrum is determined. If the light-giving object approaches the spectro-scope, or vice versa, more than the usual number of vibrations will reach the observer in each sec. On the other hand, if either the source of light or the spectro-scope recedes from the other, the number of vibrations will be less than the normal. This departure from normality is shown by a shifting of the lines (not in relation to each other, but of the whole lot) on the band of chromatic light: on approach the lines shifting towards the violet end; when receding towards the red end. Sir William Huggins was quick to see how this principle could be utilised in A., and was the first so to apply it. This principle has enabled us to tell whether stars are approaching or receding from the sun; at what rate they are doing so; the rotation of the sun on its axis, and the rotation of Saturn's rings. And as the spectrum can be photographed a permanent and accurate record can be made, and, as above mentioned, part of the spectrum invisible to the human eye can be recorded on the photographic plate.

Astrophysics, armed with the spectro-scope, made great strides during the latter part of the last century, when it was discovered how to analyse spectra. Since 1895 atomic physics has produced epoch-making results, and as one of the most striking advances, made in 1913, was the interpretation of the spectra of the element it may be imagined that astrophysics, too, received a new interpretation and the present century may be called the golden age of physics and A., for a knowledge of the atom is invaluable in interpreting the physics of the stars. As in physics, so in A., the recent progress has been due to a large number of learned astronomers, and for details of the hist. of A. during the present century the works mentioned in the following brief bibliography should be read. Mention must be made of the Californian observatories, which are modern observatories, containing the finest instruments in the world, and, in particular, the Mt. Wilson Observatory, which contains Michelson's famous telescopic interferometer, with which he first measured (in 1920) the angular diameter of a star, and of the 200-inch telescope being set up on Mt. Palomar, which, with its reflector, will weigh 1,000,000 lb. and be able to photograph light sources 1,000,000,000 light-years distant, and also of Eddington, the Eng. astronomer, whose work on *Stars and Atoms* has estab. him as not merely one of the greatest of Eng. astronomers, but one of the greatest of all astronomers.

See Sir H. Spencer Jones, *General Astronomy*, 1923; H. Macpherson, *Modern Astronomy*, 1926, and *Makers of Astronomy*, 1933; Sir A. Eddington, *Stars*

and *Atoms*, 1927; Hutchinson, *Splendour of the Heavens* (admirable photographs from the best observatories in the world), 1930; Sir J. Jeans, *The Mysterious Universe*, 1931; E. A. Milne, *The White Dwarf Stars*, 1932; J. Stokely, *Stars and Telescopes*, 1936; Sir F. Dyson and R. Woolley, *Eclipses of the Sun and Moon*, 1937; R. Waterfield, *A Hundred Years of Astronomy*, 1938 (useful to the astronomer and intelligible to the general reader); P. W. Merrill, *The Nature of the Variable Stars*, 1938; W. T. Skilling and R. S. Richardson, *Astronomy*, 1939; E. A. Beel, *A Text-book of Elementary Astronomy*, 1945; and J. B. Sidgwick, *The Heavens Above: a Rationale of Astronomy*, 1948.

**Astrophel** (Gk., star-lover): 1. The title under which Sir Philip Sidney wrote his sonnet sequence to Stella, or Penelope Devereux. The poems, written 1575-83, appeared in 1591. 2. The name of an elegy by Edmund Spenser on the death of Sidney.

**Astrophysics**, that branch of astronomy which relates to the physical components of the stars and their atmospheres. The spectro-scope and the photographic camera greatly advanced its study. See **ASTRONOMY**; **SPECTRUM** and **SPECTROSCOPE**.

**Astruc, Jean** (1684-1766), a Fr. physician and Bible critic, was b. at Sauve in Languedoc. In 1731 he became regius prof. of medicine at Paris, and his fame as a lecturer spread throughout Europe. Of his numerous medical works his most famous deal with sexual disorders and kindred subjects, e.g. *De morbis veneris libri sex* (1736). Besides being a physician, he was also a philosopher and wrote on the dual sources of the book of Genesis.

**Astura**, a vil. on a peninsula, once an is., on the coast of Latium, Italy, and near Antium. It is at the mouth of the Astura R., 39 m. S.E. of Rome. Remains of Rom. villas are excavated on the spot, and valuable traces of anct. civilisation have been revealed. Cicero had a villa at A., to which he retreated after the blow of his daughter's death. Augustus and Tiberius both frequented it, and, according to Suetonius, both here contracted their fatal illnesses. On the site of the villa there is now a lofty tower.

**Asturias**, an anct. prov. of N. Spain. The country is very rich in mines. The inhab. are insular, and having kept free from contact with other peoples, are the purest representatives of the Sp. race. The eldest son of the king of Spain was called Prince of the Asturias, a phrase coined on the analogy of the Eng. Prince of Wales.

**'Asturias'** The. The name of a Brit. hospital ship which the Gers. attempted to torpedo off Havre on Feb. 2, 1915. The A. plainly showed the Red Cross, and all other externals of its character. Later the Gers. issued an 'apology' to appease hostile judgment of neutrals. The Brit. Admiralty retaliated on Mar. 8 by announcing that they would not extend the honourable treatment which they had accorded to the crew of the

*Emden* to the officers and men rescued from *U-boat 8*, the delinquent boat.

**Astyages**, grandfather of Cyrus. According to Xenophon, A. and Cyrus lived amicably together, but another version of the story relates that A., fearing his grandson, exposed him, and he in turn dethroned his grandfather.

**Astyanax**, the young son of Hector and Andromache, and sometimes called Scamandrius. At the sack of Troy he was cast from the ramparts, that he might never restore his grandfather's kingdom.

**Astylar** (ἀ-, without, στύλος, pillar), an architectural term signifying without columns. Thus A. It. buildings are in contradistinction from those buildings which are decorated with columns. The A. class of design was introduced into England by Barry in the Travellers' club-house and Reform club-house, London.

has almost entirely ceased since the construction of the railway to Port Sudan. The granite quarries from which the anc. Egyptian builders and sculptors drew their supplies are situated in the hills to the S. An unfinished obelisk 137 ft. long and 14 ft. thick is there. Blocks were detached by boring holes, driving wedges into them, and then waiting the wedges. On the is. of Elephantine is an anc. Nilometer, and the A. Museum, containing objects found in Lower Nubia. The rock tombs of Elephantine of the princes and grandees are to be found in the hill on the opposite side of the riv. The ruined Coptic monastery of St. Simeon is also in the neighbourhood. During the Mahdia (1884-1898). A. was strongly garrisoned by Egyptian and Brit. troops, but since a defeat of the khalifa the fixing of the Egyptian frontier farther S. lessened its



THE DAM AT ASWÂN

**Asunción**, or **Assumption**, cap. of the republic of Paraguay, S. America. The city takes its name from the feast of the Assumption in 1537, which was the date of its foundation. The port (which is 950 m. from the sea) has communication with Buenos Aires by steamers. There is a Brit.-owned railway (the Paraguay Central railway) from A. to Encarnación, on the Rio Alto Paraná. There is a wireless station. The climate is hot, but is not unhealthy. The city was once the seat of the Sp. gov. of the region, and has a college, library, and many fine churches. The seat of the Paraguayan Rom. Catholic archbishopric is at A. A. has been the scene of many struggles. The Jesuits and the Church here came into serious conflict. Francia made himself despot of the city. A., too, was the centre of a war with Brazil. Pop. (1941) 178,000.

**Aswân** (or **Assuan**), a tn. of Upper Egypt, on the Nile. It is the cap. of the most southerly prov. of Egypt, bearing the same name. It is popular as a health resort and tourist centre. Some remains of the anc. city still exist in the form of granite columns and portions of the ruins of a temple. The once considerable trade in the products of the Sudan and Abyssinia

military advantages. At A. is situate one of the greatest dams on the Nile. Pop. 22,000.

**Asylum**, see **INSANITY**.

**Asylum**, **Right of**, a right, once familiar to students of international law, but now virtually obsolete in Europe, which makes an ambas.'s house a sanctuary or 'city of refuge,' whether for himself and his household or for refugee criminals. As regards the last named, the claim has long been generally abandoned in practice, and to-day an ambas.'s house is no longer accurately described as part of the ter. of his own country. A criminal who takes refuge there can now be surrendered without formal extradition process, though whether an embassy can be entered without the ambas.'s permission is open to doubt. Entry and search are probably justifiable in those extreme cases which justify the arrest of the ambas. himself. The right was exercised in Greece in 1862 and in Spain in 1875, but not elsewhere in Europe in recent years, though it has not entirely disappeared in S. America.

In another sense the R. of A. means that a neutral, consistently with his continuing friendship with both belligerents,

is allowed to receive their troops or vessels within his ter. In circumstances which ensure that the use of his hospitality will not be aggressive in its results. Such reception is properly conditioned, in the case of land forces, upon an agreement by the fugitives, to undergo disarmament in crossing the frontier, and internment within the neutral ter. as long as hostilities last.

**Asymptote** (a privative, *συν*, together, and *πτω*, to fall), a mathematical term used to denote a line which approaches nearer and nearer to another, but only coincides with it at infinity. Familiar examples of the A. curve are those obtained from the graph of the tangent and also from the hyperbola.

**Asyndeton**, is a figure of rhetoric which omits the connectives for the sake of emphasis, and in order to bring out the climax. The stock example of A. is Caesar's famous message, 'Veni, vidi, vici'—'I came, I saw, I conquered.'

**Asyút** (Assiut) or Siut, cap. tn. of prov. of same name, Upper Egypt, near W. bank of R. Nile, 248 m. S. of Cairo. Area of prov., 812 sq. m. It is the residence of the governor, and is the largest tn. and the most important commercial centre in Upper Egypt. The handicrafts for which it was formerly noted (pottery, inlaid wood, ivory carvings, leather and woven goods, and tulle shawls) are being rapidly ousted by European factory-made goods. There is an Egyptian museum belonging to a wealthy resident. The Mohammedan A. Institute was founded in 1915. Near by are the rock tombs of anct. A. It is the chief seat of the Amer. Presbyterian Mission. One of the Nile dams has been constructed here. Pop. (prov.) 1,204,000, (tn.) 60,000.

**Asystaton**, the characteristic sophism of the liar.

**Atabapo**, riv. of Venezuela, joining the Orinoco at San Fernando de A. after a course of 140 m. It forms part of the boundary between Colombia and Venezuela.

**Atacama**, a prov. in N. Chile, area 31,400 sq. m. There are some of the world's most valuable silver and copper mines in the prov. Salt is exported in large quantities. The A. desert is a vast stretch of barren country extending over the provs. of A., Los Andes, etc. It is volcanic in character, but is one of the richest ters. of the globe, having quantities of silver, copper, lead, nickel, borax, iron, salt, etc. Pop. 80,000.

**Atacamite**, a rare mineral originally found in the desert of Atacama, in S. America, and also occurring in Saxony and on the slopes of Vesuvius and Etna. It is a copper oxychloride,  $\text{CuCl}_2 \cdot 3\text{Cu}(\text{OH})_2$ , crystallises in the orthorhombic system, is usually green in colour, has a hardness of 3, a sp. gr. of 3.7, and is worked as a copper ore.

**Atahualpa**, son of Huayna Capac of Peru and 'last of the Incas.' He was deprived of the throne of Peru by the illegitimacy of his birth, as he was of the blood of the Incas only on his father's side, his mother being a captive princess of

Quito. His father therefore was obliged to leave his throne to his legitimate son Huascar, but to his favourite son A. he left the newly conquered kingdom of Quito. A quarrel sprang up between the 2 brothers, and A. was victorious, but at the moment of his victory Pizarro, the Sp. pioneer, landed in Peru. On Nov. 15, 1532, he requested A., now Inca, to pay him a friendly state visit, but took him prisoner by a horrible massacre of his bodyguard. Treachery was followed by treachery, and after A. finally professed himself Christian, he was strangled in 1533.

**Atakpame**, a gov. and mission station in the interior of Togoland, in W. Africa, having a large trade in rubber. It is connected by rail with Comé. Pop. about 8000.

**Atala**, one of the most beautiful and famous mosques of India. It is situated in Jaunpur, in the Benares div. of the United Provs. The mosque is known as the A. Masjid or Mesjid (i.e. Great), and was built in the year 1408 by Ibrahim. Its cloisters and façade are magnificent specimens of Indian architecture.

**Atalanta**, an Arcadian huntress, and daughter of Iasus and Clymene. Her father, desiring a son, had exposed her in infancy, but she was nourished by a she-wolf. She became the devotee of Artemis, goddess of maidenhood and the chase. She took part in the hunting of the Calydonian boar, and her father once more recognised her as his daughter. She was urged to give her hand in marriage, but being warned against marriage, and knowing she was without peer in swiftness of foot, she compelled all suitors to contend with her in the foot-race. He who lost must die; he who won would be her lord. Milanion conquered her by a ruse. Aphrodite gave him 3 golden apples, which he let fall during the race, and A., overcome with their beauty, stooped to pick them up. She thus surrendered herself to Milanion.

**Ataman**, see HETMAN.

**Ata-Melik**, whose complete name was Ala-eddin-ata-Melik al-Jowaini (c. 1227-1282), was b. at Jowain, near Nishapur, Khorasan. He became the confidant of Mangu Khan, and afterwards of Hulagu, by whom he was made prefect of Bagdad 1258. He was accused of peculation, and put into prison by Abaka Khan, the successor of Hulagu. He was, however, released by Sultan Ahmed, the successor of Abaka Khan. Ahmed was soon afterwards defeated by Argun, the son of Abaka Khan, and this news no doubt brought about the death of A. He was the author of *Jehankushais* (The Conquest of the World), a hist. of the Moguls, and a MS., said to contain the greater part of it, is in the Royal Library at Paris (Quatremère, *Mines de l'Orient*, vol. 1., p. 220).

**Atanjauia**, see JAUJA.

**Ataroth**, a tn. E. of the Jordan, rebuilt by the tribe of Gad (Num. xxxii.) and taken from the men of Gad by Moab, king of Moab. Generally identified with the ruins of Attârus, on the W. slope

of Jebel Attarus, 7 m. N.W. of Dhibân. Also the name of a tn. on the border of Ephraim, not far from Jericho, but unidentified.

**Atatürk Mustapha Kemal** (1880-1938), first president of the Turkish Republic and maker of modern Turkey; *b.* at Salonika. His father, who was first a custom-house officer and afterwards a timber merchant, *d.* when A. was a child. But he was given a very good education by his Albanian mother, and entered the Military College at Monastir, afterwards passing into Pancaldi, the chief military college of Turkey, where he evinced a taste for mathematics. In 1904 he became a captain. Detected in political activity, he was imprisoned, and, on liberation, was sent to Syria, where he fought the Druses and founded, among subaltern officers, a Liberty Society, which was subsequently taken over by the Committee of Union and Progress. He was politically active also in Egypt, on his way home again; and again at Salonika, where he enjoyed the protection of Cemil Bey. He returned to his old post at Jaffa, and was not heard of at Salonika for 3 years. But he then became active once more in connection with the Young Turk movement and, at the time of the revolution in 1908, was a junior major in the gendarmerie. He also saw service against the Albanian rebels in 1909-10, and when the war with Italy broke out he served in Tripoli as a member of Enver Bey's staff. Although he quarrelled with Enver, he was appointed military attaché at Sofia in 1913. Opposed to Turkey's entry into the First World War, his ability was exploited by the Gers., who gave him the command of a new div. in the Fifth Army which was concentrated for the defence of the Dardanelles, and he stopped the advance of the Allies in Gallipoli. In 1916 he went to the Caucasus in command of the Turkish Second Army, but was removed by Enver for mismanagement, for which, it is said, he was not responsible. Next commanded in Mesopotamia, but disagreed with Falkenhayn, and in consequence was sent to Aleppo; but he was recalled to activity when the Ger. plans regarding Palestine failed, and was about to assume an important command when Turkey sued for peace. At the time he was strongly criticising, in official reports, Ger. interference in Turkey's Arab policy and Enver Bey's subservience to Potsdam. In May 1919, just after the Gks. had landed at Smyrna, he was appointed inspector-general of the forces in E. Anatolia, it being supposed by Damad Pasha, who had sent him there, that he would suppress the incipient Nationalist movement. But though A. may have been opposed to the Committee of Union and Progress, he was a patriot. He started a movement which rapidly spread among the Anatolian soldiery and led to a conference at Sivas at which A. and his *compères* drew up their 'National Pact.' For this he was outlawed, but his attitude towards the ill-starred

treaty of Sèvres quickly marked him out at the spear-point of Turkish resistance to Greece and the aspiration of Venizelos towards a greater Greece at the expense of Asiatic Turkey. After the invading Gks. had everywhere been repulsed, he consented to an armistice at Mudania (Oct. 11, 1922). The sultan fleeing from Constantinople in Nov., A. was left the only power in Turkey; and on July 24, 1923, at Lausanne, he made peace with the Allies. On Oct. 29 the Republic was declared, with A. as president. In Mar. 1924 the Popular party, which he led and which had a majority in the Assembly, passed a law abolishing the caliphate and ordering the exile of all members of the House of Osman. A. then turned to the secularisation of Turkey and to the complete destruction of his political opponents. He governed as a dictator, combining the offices of president of the Republic, of the Council of Ministers, of the Grand National Assembly, and leader of the Popular party. Following the Kurdish rebellion, which had been fomented by religious leaders, he closed all Moslem religious houses, and not only prohibited any distinctive dress of the orders of the dervishes, but imposed European head-dresses and raiment on Turkish subjects, as being the 'ordinary clothes in use among the civilised nations of the world' (1925). About the same time the Assembly abolished various traditional restrictions on female education and abolished polygamy. There was a plot against his life at this period, but it was discovered and many political opponents were executed or banished. A. was now the undisputed master of Anatolia, and this fact was emphasised at the election of 1925, when his party won all 300 seats. From that time he and his ministers proceeded from one reform to another. He instituted a civil code on the Swiss model for the Moslem Sacred Law and in Apr. 1928 secured a modification in the constitution by which Islam ceased to be the State religion. In 1934 he abolished the old titles of pasha, bey and effendi. In the same year the franchise was given to women, nearly a score of whom were elected to the Assembly in 1935. At the same time the Assembly ordered the use of surnames, the lack of which in Moslem countries was always a source of confusion. He himself was given the surname of Atatürk, or Chief Turk, by a special law passed by the Assembly. During his dictatorship there were numerous other beneficial reforms—notably in public health, education, and agriculture. In the sphere of foreign policy A. was no less successful. Anglo-Turkish relations became markedly better—thus paving the way for the pact of 1939; a Turco-Greek entente was initiated in 1930; Turkey became a member of the League of Nations in 1932; and, in 1934, a Balkan pact was made for the mutual respect of the boundaries of the signatories. In 1936 Turkey won a diplomatic triumph at Montreux, when it regained sovereignty

over the Dardanelles and Bosphorus from the powers which had signed the Straits Convention of 1923. A. was the first to insist that the New Turkey must renounce all claims to influence outside her racial frontiers. Determined to remain the master in Turkey, he boldly abdicated all claims outside it. From the very first months of 1919 he felt that that was the only way to salvation for a really independent Turkey. This appears to have been his attitude in his policy towards the Senussi in 1919, when he renounced any intention of renewing Turkish domination over the Arabs, a domination which he regarded as one of the causes of Turkish decline. But suspicion of Gks. and Armenians, who in the old Turkey used to have the monopoly of commercial life, explains, if it does not excuse, the fact that his policy blindly ignored all considerations of social economy. He believed that it was enough to expel the foreigners from their posts to have all the gains going into Turkish pockets; but he overlooked the fact that the mercantile genius of the Gks. and the Armenians, and of all the Levantines of European origin, had been created by centuries of tradition and work. But, on the other hand, it is not to be forgotten that the expulsion from Anatolia of all the rich Hellenic colonies that, for long centuries, had kept in W. Asia the monopoly of trade, navigation, and industry, was conceived by Venizelos under the form of a project for the exchange of pops. A million and a half Asiatic Gks., previously rich and contented, were thrown back on the coast of Greece as social pariahs. Turkey lost by the exchange, as she lost by all her xenophobia, but it was impossible to expect that A. and his Gov. would renounce this unique chance of changing their country into a homogeneous Turkish state, containing fewer extraneous elements than any other nation in Asia and probably also in Europe. Combining ruthless vigour and fiery ambition with a bold intellectual radicalism, utterly unaffected by historical tradition or religious sentiment, he lived a hard and intemperate life. He married in 1923, but divorced his wife because he thought that she was endeavouring to influence his political decisions. He d. of cirrhosis of the liver.

**Ataulphus**, or **Ataulf** the 'Father-wolf' (derived from *atta*, father, and *wulfs*, wolf, a name now corrupted into Adolf), king of the Goths and brother-in-law of Alaric. He had a successful military career, and conceived the brilliant idea of blending the Rom. and the Gothic races, that Rom. civilisation might moderate the barbaric hardness of the Goths.

**.Atavism** (Lat. *atavus*, a great-great-grandfather), a biological term used to denote a reversion to some remote ancestral type. It is a species of heredity common to animal and plant life. Thus coloured blood may come out after its apparent disappearance for many generations, or some old family characteristic

may make a sudden reappearance. Pure breeds may occasionally breed a common type or in horticulture cultivated species may revert to the common type.

**Athara**, the most N. trib. of the Nile. The A. was the theatre of a battle fought between a Mahdist army under Mahmud and a Brit. army under Lord Kitchener. The battle resulted in the capture of Mahmud and the rout of the Mahdists. This victory was followed by the decisive battle of Omdurman.

**Atchafalaya**, a name applied to an outlet of the Red R., 220 m. long, and according to derivation signifying Lost River. The origin of the name is the fact that it was supposed to have been the original bed of the Red R. The A. receives also in time of flood the waters of the Mississippi. Its course is southward, and passing through Chetimaches Lake it throws its waters into Atchafalaya Bay.

**Atchin**, or **Atoheen** or **Achin**, a Dutch prov. in the N.W. of the is. of Sumatra, with an area of about 21,300 sq. m. The is. has a backbone of mt. ranges from which numerous small rvs. descend to the coast on either side. The inhab. of A. are distinct from the other inhab. of the is., and hold themselves aloof. They have an admixture of Arab and Hindu blood. In their religion they are Muslims and retain the Moslem robe and turban characteristic of the Arabs. They are more industrious and intelligent than the neighbouring peoples, but they are very treacherous and unreliable. The social organisation of the Atchinese is communal. The ter. was rich in gold and attracted merchants from the sixteenth century, but the Atchinese persistently opposed the establishment of commercial relationship with European countries. Much fighting preluded the Dutch establishment in A. in the year 1875. Pop. 1,000,000.

**Atchison**, a city of A. co., Kansas, U.S.A., situated on the l. b. of the Missouri, and named after the leader of the pro-slavery party. The city is an important railway centre. Pop. 13,000.

**Atchison, Topeka, and Santa-Fe Railway**, U.S.A. A railway system extending through Missouri, Arkansas, Texas, Kansas, Colorado, New Mexico, Oklahoma, and Arizona. The system has now a total mileage of 10,445.

**Ate**, daughter of Eris (Strife) and Zeus, a Gk. goddess who represents the infatuation that leads men to ruin. In tragedy her mission is more moral, and instead of being the goddess of destruction she is the personification of retribution.

**Atef Crown**, a form of head-dress worn by Egyptian deities, consisting of a tall white cap, with a plume on each side, and bearing the solar disk and uræus in front.

**Ateles** (Gk. *ἀτέλης*, imperfect), a genus of S. American primates known as spider-monkeys. They belong to the family Cebidae. The thumb is absent (hence their name), the limbs long and very flexible, the tail long and much used in climbing. *A. paniscus*, the coaita,

inhabits Brazil; *A. belzebuth*, the marimonda, Guiana.

**Atellanae Fabulae** were an old Oscan type of drama introduced into ant. Rome. These dramas were improvised burlesques from low life. Certain stock characters appeared, e.g. Maccus the fool, Pappus the father, and Dossennus the humpback. They were the only type of play in which a Rom. citizen could act without losing caste as such. The A. F. lingered after many revivals till far into the empire.

**A tempo** (It., in time), a musical term used to indicate a reversion to the time at the beginning of a movement, when that time has been altered, e.g. *ad libitum*, *a piacere*, or for a longer time, e.g. *più lento*, *più allegro*, etc.

**Ateshgah** (place of fire), a place about 1 sq. m. in area, from the soil of which issues natural gas. It is a place of worship among the Guebres or Persian fire-worshippers.

**Atessa**, a small, finely situated tn. near Chieti in the S. of Italy. It has a fine collegiate church and other public buildings of note. Pop., tn. and dist., 10,000.

**Atfah**, the ant. Aphroditopolis, is an Egyptian tn. situated on the r. b. of the Nile, in the gov. of Ghizeh. Pop. about 3000.

**Ath**, a tn. on the Dender in the prov. of Hainaut, Belgium. It was once a fortified stronghold. A battle was fought here in Nov. 1918. Pop. 10,000.

**Athabasca**: 1. Before 1905 a great dist. in Canada was known as Athabasca. It covered an area of 251,000 sq. m. and was situated in the N.W. Ters. In 1905 parts of it were given to Saskatchewan and Alberta and in 1912 the rest became part of Manitoba. 2. A riv. and affluent of the Mackenzie (also named the Elk or Reindeer R.), and likewise a lake in the prov. of Alberta, Canada. The word A. means grassy carpet, a name applied to the riv. owing to the abundant herbage produced at the delta. The source of the riv. is a small lake at the base of Mt. Brown in the Rocky Mts., called the Committee's Punch-bowl. The A. flows from the mts. in a N.-eastward direction, receiving many affluents and the drainage of the Lesser Slave Lake. An interesting feature of the riv. is the point where it takes the 'Great Rapids,' a long slope where the water flows steadily and without cascades. After a course of 550 m. the A. enters Lake A. The lake is shaped like a great bow with the horns pointing southward. The main affluent of the A. lake is called the Great Slave R., and is formed by the union of the A. and Peace Rs. The Great Slave R. in turn flows into the Great Slave Lake, and takes the name of the Mackenzie R. The A. (lake and riv.) are thus part of a great system which drains and waters a vast tract of Canada. The A.-Mackenzie, whose united length is 2700 m., together with the recipient lakes, provides most valuable transportation facilities.

**Athalaric** (516-534), a king of the Ostrogoths, and grandson of Theodoric. He ascended his grandfather's throne in

the year 526, but being only 10 years of age, his mother, Amalasuntha, became queen-regent. During his minority he contracted vicious habits which undermined his constitution and caused his premature death.

**Athallah**, daughter of Ahab, king of Israel, and Jezebel, and wife of Jehoram, king of Judah. She inherited her mother's evil instincts, and under her influence the cult of Baal spread in Judah. On the death of her son Ahaziah, after a massacre of all her grandchildren except Joash, who managed to escape, she reigned in Israel for 6 years. Joash deposed her, and she was struck down as she witnessed her grandson's return to the throne.

**Athalie**, the title of the last tragedy of Racine, written by him in 1691 by the wish of Madame de Maintenon, who desired, for use in her girls' school at St. Cyr, a play in which sexual love was not mentioned. The drama is founded upon 2 Kings and 2 Chron., and is remarkable for religious fervour and emotional force.

**Athamas**, son of Æolus, king of Thebes, married Nephele, and by her had Phryxus and Helle. He forsook Nephele for Ino, and by her had Learchus and Melicerta. Ino persecuted the children of Nephele, and Ino in revenge visited A. with madness, whereby he slew his son Learchus.

**Athamelik**, surnamed Ala Eddin, was a famous Persian statesman and historian of the eighteenth century. He was twice governor of Bagdad, which he much improved during his term of office, building new mosques and canals.

**Athanagild**, a captain of the Sp. Goths who d. at Toledo in A.D. 547. With the help of a Rom. force sent from Gaul by the Emperor Justinian, he defeated and killed King Agila near Seville in 534. A. then became king of the Goths in Spain, and endeavoured to drive his Rom. allies out of Spain. He was unsuccessful, but reigned 14 years over that part of the country occupied by the Visigoths. Brunehaut, one of his two daughters, married Sigbert, king of Metz.

**Atharic**, a prince of the Visigoths bearing the title of judge. He engaged in a long unsuccessful campaign with the Emperor Valens, and peace was ratified in 369. In 376 he was defeated by the Huns who had advanced into the confines of Europe. In 381 he took refuge with the Emperor Theodosius at his court in Constantinople, but d. shortly after his arrival.

**Athanasian Creed**, see **ATHANASIU** and **CREED**.

**Athanasiu** (c. A.D. 296-373) was b. in Alexandria. His life is distinguished by his steady and notable resistance to the doctrines of Arius. He distinguished himself at the Council of Nicea (325), and in the year following that council he was made patriarch of Alexandria and primate of Egypt. Arius, who had been banished after the Council of Nicea, was, chiefly owing to the fact that the favourite sister of the Emperor Constantine had leanings towards Arianism, restored to favour.



A. was ordered—entreated perhaps would be the better phrase—to restore Arius to Christian communion, but he refused. For this and other acts which concerned his treatment of 6 of the Arian bishops, and particularly the Bishop Arsenius, he was tried and condemned at Tyre. He flung himself on the justice of Constantine, but was banished for a little over 2 years to Treves, whence he was restored by the younger Constantine on his accession (338). At a synod which was held at Antioch it was decided that a bishop deposed by one synod could only be restored by an equal synod, and this decision was immediately applied to A., who was again driven into exile. Part of this exile was spent in Rome, where he quickly gained the sympathies of the W. Church, and his innocence was upheld by the It. bishops in council. At a synod convened at Sardica, and at which met representatives of the E. and W., his cause aroused the deepest and angriest feelings, and the beginnings of a separation between E. and W. Churches are obvious for the first time. Constans, emperor of the W., by a threat of a religious war unless A. was immediately restored, brought about his restoration by Constantius in 349. Two years after, however, he was deprived of his protector (Constans) by his assassination in 351. By councils which were held at Arles (353) and Milan (355) his condemnation was brought about with great difficulty. In 356 he was expelled from Alexandria, which was given up to the plunder of the imperial army, while A. sought refuge in the deserts of Upper Egypt amongst men who regarded him with the greatest respect and refused to betray him. For 6 years he remained in exile. In 362, during the empire of Julian, A. returned, but was soon in exile again. Julian hated him, and, in his own words, desired his death, giving as his reason: 'The contempt that is shown for all the gods fills me with grief and indignation.' A. eluded capture, and again took refuge in the monasteries of the Upper Nile. He returned in 363 during the empire of Jovian, and save for a short break under Valens remained to carry out his work in Egypt until 373. His death was the signal for the outbreak of religious persecution. He had been primate of Egypt for 43 years, and had been in exile 4 times. He was the leader of the Church during one of its most dangerous periods, and showed by his zeal, his fervour, and his firmness an example which was not without imitation during his own age. As a writer and an orator he had superiors amongst his contemporaries, but as a leader of men and of the Church he was without equal. The creed which embodies his doctrines and beliefs was not heard of until some centuries after his death.

**Athanasius:** 1. Bishop of Perrha. Serious accusations were brought against him by his colleagues, and A. refused to appear when summoned. He was deposed and again c. 450, when an attempt was made to re-examine the evidence, he

refused to appear on the ground that the jury was predisposed to condemn him. 2. Bishop of Ancyra (A.D. 360-69) through the influence of the Arian Acacius, but throughout his career he was rigidly orthodox, and St. Basil commended him as the bulwark of orthodoxy.

**Athapasean**, a linguistic family of N. Amer. Indians, inhabiting Canada, California, and the Rio Grande dist., and formerly known as the Chippewayan. It may be divided into 3 main branches: the N., about 8595 strong, in Alaska and Canada; the Pacific, about 895 strong, in Washington, Oregon, and California; and the S., about 23,400 strong, in Oklahoma, Arizona, New Mexico, and Colorado.

**Atheism**, disbelief in the existence of a God. A. should be carefully distinguished from scepticism, with which in the popular mind it is very often confounded. One sect is very apt to charge an opponent sect with A. merely because the doctrines of that sect are not understood. Thus Xenophanes, who rejected the gods of the popular Gk. religion, incurred the charge of A., though his attitude was almost monotheistic. Socrates, too, was charged with A. because he did not believe in the gods that the city worshipped. Even the early Christians were called atheists by the Romans, because the absence of images and the other familiar appurtenances of worship was to the material Rom. mind incomprehensible. Philosophic A. fails to find evidence of a god manifest in the universe. In Greece positive atheists were the followers of Democritus, Leucippus, and the materialistic schools. In Rome there were very many sceptics, but very few atheists. Lucretius was unique, standing apart from his age and from his race. His book *De Rerum Natura* (On the Nature of Things) is one of the most fervent denials of the divine ever penned. 'Gods' there are, but these 'gods' are not immortal, according to Lucretius, but only beings, endowed with a happier and longer life than ordinary mortals. Lucretius had no followers at Rome, and his book was ignored for many generations. In recent times Europe has produced not a few eminent atheists, e.g. von Holbach, and Gustave Flourens. Modern A. falls into three classes: (1) *Dogmatic A.* which positively asserts there is no God. (2) *Sceptical*, which maintains that the finite mind of man is incapable of asserting whether there is or is not. (3) *Critical*, which holds that the evidence for Theism is inadequate. Plato first asserted that no one after adopting in his youth the doctrines of A. persisted in such doctrines in old age—a theory that has frequently been reasserted. In India the disbelief in the existence of God is common from very early times. Notably atheistic are the Sankhya system and the more modern Jainism. A. as a system did not have many adherents among the Jews. The Jewish mind was not prone to analyze religious beliefs. Still there are traces of it, e.g. Jer. v. 12, 'They denied the Lord and said, He is not';

and Psalm x. 4, 'The wicked in the haughtiness of his countenance says, He will not require, all his thoughts are, There is no God.'

**Atheling**, an A.-S. title of nobility used by the descendants of the first invaders, but by and by this title of honour was used only by the members of the royal family, i.e. kings and the brothers and sons of kings.

**Athelney**, a marsh at the junction of the Tone and Parret, formerly an is., in Somerset, England. Here Alfred fled (A.D. 878) when oppressed by the Dan. invaders. On regaining his throne he founded a Benedictine monastery on the is. in commemoration of his retreat, and portions of it have been excavated. A ring was found bearing Alfred's name, and is now preserved in the Ashmolean Museum, Oxford.

**Athelstan** (c. 895-940), son of King Edward the Elder, and grandson of Alfred the Great. He succeeded to the throne in 924, not without opposition. He annexed the kingdom of Northumbria, and then made tributary to himself the kings of Wales, Cumbria, Scotland. His title thenceforth was king of Britain. These dependent kings then conspired against him, but the battle of Brunanburgh, a signal victory for A., put an end to the opposition. A. was the first king to unite England and to establish a connection with Europe by uniting the female side of his line with European princes.

**Athena**, a Gk. goddess, according to a quaint legend born from the head of Zeus, who, fearing that the child about to be born would surpass himself, had previously swallowed her mother, Metis (counsel). This myth symbolises the intellectual character of the deity. Her distinguishing attribute is the regis (a shield or cloak), bearing the gorgon's head. Other characteristic symbols are the owl, the serpent, and the olive branch. In Gk. poetry her name is qualified with the fixed epithet *glaukopis*, translated 'grey-eyed,' but possibly really signifying 'owl-eyed'—just as the fixed epithet of Hera is 'ox-eyed.' These 2 epithets may be a survival of totemism. A. was patroness of many arts and divine protectress of many human experiences. She was protectress of Athens, goddess of wisdom, of war, of agriculture, and of the various crafts that belong to women. The story of how she became patroness—deity of Athens is one of the most famous of Gk. legends. Poseidon and A. contested for the honour, and each brought forth a gift-symbol. Poseidon struck the ground and a horse arose, symbolical of war, but A. produced an olive branch, symbolical of peace and prosperity. The latter was adjudged the better gift, and A. became patron-goddess. At Athens to A. in this character was dedicated the Parthenon, the most magnificent example of Gk. architecture, and 2 magnificent and colossal statues by Phidias (one in gold and ivory, and the other in bronze) represented her in all her beauty, dignity, and power. As the goddess of wisdom

she, along with Apollo, with whom she was associated, is one of the most characteristic of Gk. deities. Literature and fine art were under her protection, and it is in literature and fine art that the glory of Greece chiefly lies. In a sterner aspect she was associated with war, but war in which she is concerned is war waged on the side of justice. Hence she is associated with victory and worshipped as its personification (Athena Nike). Anct. art very often represents her contending with the giants. But the milder side of her character is revealed in her association with women's work—chiefly weaving. A., like Diana, remained a virgin and protected the virginity of women. In art she was usually represented in full armour, bearing helmet, spear, shield, and regis. Her chief festival was the Panathenæic games.

**Athenæum**: 1. A temple of Athena used as a seat of learning at Athens. 2. A similar institution at Rome, built by Hadrian A.D. 135 for philosophy, rhetoric, law, etc. The name thus began to be applied to colleges in general, e.g. at Constantinople and at present at Marseilles.

**Athenæum**, formerly a high-class literary journal, pub. weekly. After an existence of nearly a century, it was incorporated, in 1921, in the *Nation*, a weekly (q.r.), later called the *Nation and A.* The A. was started by James Silk Buckingham in 1828, but in his hands the paper was not successful. From 1828 to 1832 Charles Wentworth Dilke was one of the proprietors. Others were Hood, Allan Cunningham, and John Hamilton Reynolds. Two years after the paper was started it passed under the sole control of Charles Wentworth Dilke. In 1831 Dilke reduced the price from 8d. to 4d., and in spite of the duty and the cost of the paper, it flourished. Other writers were Hogg, the Ettrick Shepherd, Leigh Hunt, and William Roscoe. Dilke was not only an innovator in the price of the paper, he also tried to make a revolution in journalistic principles. He asked no favour of any publisher, and refused to allow his criticisms to be biased in any direction. In 1846 Dilke resigned the editorship of the A. and went to the rescue of the *Daily News*. The paper was amalgamated in 1931 with the *New Statesman*.

**Athenæum Club**, a famous institution in Pall Mall, founded in 1824 'for the association of individuals known for their literary or scientific attainments, artists of eminence in any class of the Fine Arts, noblemen and gentlemen distinguished as liberal patrons of Science, Literature, and the Arts.' Membership is attained by ballot-vote or the vote of the committee (restricted to 9 new members each year). The club consists of 1200 members, who pay a yearly subscription of 15 guineas, with an entrance fee of 30 guineas. Attached to the club is the finest library in any club. Ten per cent black balls excludes from membership.

**Athenæus**, an erudite Gk. grammarian,

b. at Naucratis in Egypt, *fl.* c. A.D. 200. He studied in Alexandria and Rome. He wrote a miscellany called the *Banquet of the Learned* in the form of conversations of learned guests at a prolonged feast. The book is crammed full of valuable information concerning Gk. letters and science, and is one of the best sources for fragments of lost comedies, etc. The *editio princeps* is the Aldine, pub. 1524. Others: by Casaubon (1597), Lindorf (1827), Meineke (1859), Kaibel (1887). See also K. Mengis, *Die Schriftstellerische Technik im Sophistenmal des Athenæus* (Paderborn), 1920. There is an Eng. translation by Yonge in Bohn's Classical Library; and by Charles Burton Gulick in the Loeb Classical Library, *Athenæus: The Deipnosophists*, 7 vols., 1927-38.

**Athenæus**, a Gk. writer, probably contemporary with Archimedes. A work by him on engines of war (*Περὶ Μηχανημάτων*) is extant, and printed in the collection of Thévenot. This work is addressed to M. Marcellus, supposed to be the conqueror of Syracuse.

**Athenæus of Attalia**, a physician who *fl.* in Rome about the middle of the first century of our era, and estab. the Pneumatic school in medicine. A few fragments of his writings are preserved by Oribasius and Aetius, and allusions are made to his opinions in the writings of Galen. The theory, which originated with A., and was adopted by sev. other distinguished physicians (Aretæus), derived its name from the *pneuma*, or spirit, a notion of which these physicians made frequent use in their explanations of life and disease. This *pneuma* formed an important principle in the physical science of the Stoic philosophers, from whom the Pneumatic physicians seemed to have derived it. The very scanty remains of the Pneumatic doctrine do not enable us to judge whether its spirit resembled the *vital principle* of some modern physiologists; nor can we appreciate in what manner the Pneumatics conceived the efficacy of this spirit as connected with those principles which they admitted in common with other ant. schools, the elementary qualities, heat and cold, which they called active principles, and dryness and moisture, which they termed passive principles. (Leclerc and Sprengel's *Histories of Medicine*.)

**Athenagoras**, a Gk. Christian apologist, who *fl.* in the second century A.D., b. at Athens, and taught there and at Alexandria. Best known by his *Legatio pro Christianis*, addressed to the Emperor Marcus Aurelius, in which he defended the Christians. He also wrote a treatise on the resurrection of the body. Works trans. by Humphreys, 1714.

**Athenals**, see EUDOCIA.

**Athenion**, a Sicilian slave, but by birth a Cilician, who lived in the latter part of the second century B.C. He was the overseer to 2 wealthy brothers, and on the insurrection of the slaves in Sicily (known as the second Servile war, 102 B.C.) he gained over the slaves under his charge. Other slaves flocked to his

standard, and he soon had 10,000 followers. He assumed the title and state of a king, and told his followers that he was destined to reign over Sicily. He laid siege to Lilybæum, but failed in his attempt. He then joined Salvius, another slave-leader, who had assumed the name of Tryphon, and who had a stronger force than A. The Rom. Senate sent L. Licinius Lucullus to subdue them, and although he was at first successful he was defeated when he laid siege to Triocala. Tryphon died, and A. succeeded him, but was defeated and slain by Manius Aquilius the consul in 101 B.C. Aquilius ended the war in 99 B.C.

**Athenion**, who lived in the first century B.C. was the son of a Peripatetic philosopher of the same name, by an Egyptian slave. He was set free, and assumed the name of Aristion. He kept a school in Athens, and ultimately became tyrant of that city. He helped Mithridates in his wars against the Romans, and with Archelaus, the general of the king of Pontus, held the city against Sulla. He was afterwards put to death by Sulla.

**Athenion**, a painter, who was b. at Maronea in Thrace. He was a pupil of Glaucion of Corinth. Pliny, in his *Historia Naturalis*, xxxv. 40, speaks of him in very high terms.

**Athenion**, a comic poet. Athenæus gives a long extract from his *Samothracians*, xxiv. 80.

**Athenodorus**: 1. Arcadian sculptor, *fl.* about 350 B.C. Most successful with noblewomen. 2. Rhodian sculptor of first century B.C. One of the three who produced the famous 'Laocöon'. 3. Gk. physician contemporaneous with Plutarch. 4. Of Tarsus, a Stoic philosopher surnamed Cordylion, was keeper of the library at Pergamum; afterwards removed to Rome, where he lived with M. Cato, at whose house he d. 5. Of Tarsus (74 B.C. to A.D. 7), also a Stoic philosopher, surnamed Cananites from Cana, Cilicia, the bp. of his father. Taught at Apollonia in Epirus, where the young Octavius (later the emperor Augustus) was one of his disciples.

**Athenry**, par. and unkt. tn. of Ireland, in Galway co., 10 m. N.W. of Loughrea. Friday is the market day. Pop. 3000. The pop. of the town is 800.

**Athens**, cap. of ant. Attica and modern Greece, situated on the Attic plain, 4½ m. from its harbour, Piræus, on the gulf of Ægina. The plain is surrounded by hills: Mt. Hymettus lying to the E., Pentellicus to the N.E., Parnes to the N.W., and Ægaleus to the W. and sloping S.W. to the Saronic Gulf. It is crossed by sev. lower ridges, partly occupied by the city itself. The greatest height of these, Mt. Lycabettus, directly overhangs the city, within which are the rocky masses forming the Acropolis and Areopagus. The plain is watered by the Ilissus and Cephissus, both irregular mt. streams. A. is approached on the W. by the 'Sacred Way,' over the plain of Eleusis, and on the S.W. from Piræus, over what was formerly a swamp, and

there are railways to Piræus, Laurium, and Corinth and a tram-line to Phaleron. This last was the first harbour of A., but it, together with Munychia and Zea, was early replaced by Piræus, now one of the chief ports of the Mediterranean. The city was connected with the ports by the famous 'long walls.'

The original site of the city was undoubtedly the Acropolis, on the summit of which have been found traces of a prehistoric wall. Buildings soon extended to the S. and W. of the hill, and this city, the foundation of which is ascribed to Theseus, was enclosed by a strong wall with 9 gates, portions of which still remain. There can also be

spot in the city. The square is surrounded by cafés which usually remain open all night. Here, too, is the entrance to the underground station, and 7 streets run into the square. Numerous wide boulevards, the most important of which are Piræus Street, Athens Street, Stadium Street, and Univ. Street, radiate from the central Place de la Concorde, and contain fine gov. and univ. buildings, and the offices of the many archaeological and other societies for which A. is famous. There are 2 univs. at A., the National and the Capodistria. It is the see of a metropolitan, and possesses an ugly cathedral built in 1855. Before the capture of A. by the Turks, the



ATHENS FROM THE ACROPOLIS

E.N.A.

traced the course of the great wall of Themistocles, built immediately after the Persian wars, 479 B.C. and the gate of Hadrian probably marks the limit of the extension to the E. made under the Emperor Hadrian. The modern city lies mainly to the N. and E. of the Acropolis, in the depression between it and Mt. Lycabettus. But the increase in pop. during the present century, owing to some extent to the arrival of refugees from Asia Minor, has led to the building of many suburbs, Mt. Lycabettus being now almost surrounded by buildings. Approaching the Acropolis, the streets become narrow and cobbled, and open drains run down the middle of some of them. A. has been almost entirely rebuilt since it became the cap. of the new kingdom of Greece at the withdrawal of the Turkish garrison in 1834, and is now a regular and attractive city, extending in the form of a semi-circle, and divided into 6 dists. It is connected with the older part by the 2 main thoroughfares of Hermes Street and Æolus Street, intersecting at Constitution Square the site of the royal palace, 1834-38. Omónia Plateia (Place of Harmony) is the business centre, but it belies its name, for it is the noisiest

Parthenon was the cathedral. The Theseum and Erechtheum were also converted into churches in the Middle Ages.

The antiquities of A. are probably unequalled in the world. The most famous is the Parthenon, dating from the reconstruction of A. after the Persian wars. It is white marble, 228 ft. long and 100 ft. wide, ornamented by Phe'dias, and surrounded by 46 Doric columns. Even in its ruins it is the most perfect specimen of Gk. architecture extant. To the N. of the Parthenon is the Erechtheum, which contained the statue and sacred olive of Athena, and had a wonderful portico of Caryatides. At the W. end of the Acropolis, just above the great gateway (the Propylæa) stands the temple of Athena Nike, or Apteros Nike (Wingless Victory). At the foot of the hill to the N. is the Theseum, dating from the time of Pericles, and in excellent preservation, and to the S. the temple of Dionysus and the Odeon of Herodes Atticus. The Areopagus, or Mars's Hill, was the meeting-place of the great council of that name, and popular meetings were held on the mound of the Pnyx, also near the Acropolis. Just outside the city to the S.E. are the ruins of

the temple of Olympian Zeus, begun by Pisistratus, and completed by Antiochus Epiphanes and under the Emperor Hadrian. The Stadium, on the banks of the Ilissus, was built by Lycurgus, 330 B.C., rebuilt by Herodius Atticus, A.D. 140, and after being largely destroyed in the Middle Ages, was restored in 1905. Thanks to the archaeological societies which have made A. their headquarters, the Acropolis has been entirely cleared of Turkish and medieval remains, and many of the anct. buildings have been restored as nearly as possible to their former state. Excavations which have led to the discovery of innumerable examples of Attic art were still being carried on before 1939.

The early hist. of A. is very obscure. It seems to have been originally one of numerous petty states, but early emerges as the cap. of Attica, traditionally united under Theseus. The earliest form of gov. was a monarchy, but the powers of the king were gradually limited by the nobles (Eupatrides), and the rule of archons (q.v.) represents a period of 'aristocracy.' The citizens seem to have been divided into 4 tribes, each consisting of 3 brotherhoods. The growth of the democracy was gradual, being assisted by the legislation of Draco, 621 B.C., Solon, 592 B.C., and Cleisthenes, c. 500 B.C. A. took a leading part in repelling the Persian invasion of 490 B.C., and in the final defeat of Xerxes, 480-79 B.C., and after this, by the establishment of the Delian League, became mistress of the whole of the Gk. states. The golden age of Athenian power and culture, 480-430 B.C., which reached its highest point under Pericles, witnessed the production of its finest buildings, its most perfect sculpture, by Pheidias, and the poetic drama of Æschylus and Sophocles. Its prosperity began to decline from the end of the Peloponnesian war, 403 B.C., when Sparta became the premier state of Greece, and suffered still further by the victories of Macedonia, culminating in the battle of Chæronea, 338. Its intellectual supremacy, however, long outlived its temporal power. In 146 B.C. A., together with the rest of Greece, became part of the Rom. empire. Under Rom. rule it flourished, and became a great educational centre, declining, however, with the spread of Christianity. At the fall of the empire it passed under Byzantine rule, and early in the thirteenth century became the seat of a Frankish duchy. In the mid-fifteenth century A. was captured by the Turks, and practically disappeared from European hist. for centuries. Except for a brief period of Venetian rule, 1687-90, it remained in the hands of the Turks till its capture by the Gk. patriotic party in 1822. It was retaken by the Turks, 1826-27, but became cap. of the new kingdom in 1834. A. has become the centre of archaeological research in Europe, the chief institutions being the Fr. School of Archaeology, 1846; the Ger. Imperial Archaeological Institute, 1874; the Amer. School of Classical Studies,

1882; and the Brit. School of Archaeology, 1883. The pop. of anct. A. in its time of greatest prosperity was about 300,000; in the sixteenth century it is said to have fallen to 12,000. In 1938 it was about 393,000. Recent public works of importance include the A.-Piræus electric light and power scheme and the A.-Piræus water supply scheme. As to the former, the Gk. Gov. concluded a contract in 1925 with an Anglo-Hellenic group for operation of power by various transport services in the A.-Piræus district. The question of an adequate water supply for A. had been discussed for some 40 years, when, in 1926, the Gk. Gov. decided in favour of a scheme for a dam near Marathon to hold up the waters of the Charadros and Varnariv. and eventually a contract was given to an Amer. company, the Ulen Water Company. The dam is nearly 300 yds. long and the reservoir holds over 40 million cub. ft. of water. A tunnel over 13 m. long leads the supply as far as Chelidonon, where the dam station is estab. In the sphere of education the A. Academy was inaugurated in 1920, during the regime of Gen. Pangalos; the statutes of the Academy provide for instruction in letters and fine arts, moral and political sciences, and positive sciences. Recently the A.-Piræus railways were taken over by the Hellenic Electric Railway Company, together with the tramways to the Piræus quays, which have now been extended to Perama. Some quarters of A. have become considerably extended since 1922 owing to the large immigration of refugees from Asia Minor following the Gk. debacle in the war against Turkey, 1921-22. The quarter especially affected is the Patesia dist. and also the environs of A., particularly Kephissia. In the Second World War the Gers. entered A. on Apr. 27, 1941. Brit. forces entered the city on Oct. 14, 1944. On Dec. 5 fighting began in the city between E.L.A.S. troops and Brit. and Gk. regulars. On Dec. 26 Mr. Churchill and Mr. Eden arrived in A. to settle the differences between the rival Gk. political parties and a week later the archbishop of A. became Gk. regent.

See E. Abbott, *Pericles and the Golden Age of Athens*, 1891; Sir J. G. Frazer, *Pausanias* (trans.), 1898; E. A. Gardner, *Ancient Athens*, 1902; C. H. Weller, *The Monuments of Athens*, 1913; W. S. Davis, *A Day in Old Athens*, 1914; T. G. Tucker, *Life in Ancient Athens*, 1930; W. Judeich, *Topographie von Athen*, 1931; R. J. Bonner, *Aspects of Athenian Democracy*, 1933; and bibliography for ACROPOLIS.

Athens: 1. Cap. of Clarke co., Georgia, U.S.A., 92 m. N.W. of Augusta. It is the seat of the univ. of Georgia, and an important cotton market. Pop. 18,000. 2. Cap. of A. co., Ohio, U.S.A., on Hocking R., 40 m. S.W. of Marietta. The seat of Ohio Univ. and of a state asylum. Pop. 7000.

Atherfield Clay, beds of clay, forming in some parts the lowest strata of the Lower Greensand beds, and resting upon the Wealden clay. It is exposed at

A., in the Isle of Wight. The average thickness is 60 ft., and the deposit contains numerous crustacean fossils.

**Atherstone**, tn. of Warwickshire, England, 7 m. S.E. of Tamworth. The prin. industry is hat-making. Close by are the ruins of the Cistercian abbey of Merevale, founded 1149. The tn. stands on the Rom. Watling Street, equidistant from London, Liverpool, and Lincoln. Pop. 6700.

**Atherstone**, Edwin, Eng. poet (1788-1821), a friend of the painter Martin, whose works influenced his poetry. His chief publications were *The Last Days of Herculeum*, 1821, *The Fall of Nineveh*, 1828-30; *The Sea-Kings in England*, 1830; *The Handwriting on the Wall*, 1858; and *Israel in Egypt*, 1861.

**Atherton**, a tn. of Lancashire, England, 13 m. N.W. of Manchester. Contains large cotton factories, ironworks, and collieries. There were formerly many silk-weaving mills. The nonconformist chapel is famous for its minister, 'General' James Wood, who raised a troop against the Pretender, 1715. Pop. 20,000.

**Atherton**, Charles Gordon (1804-53), Amer. politician, b. at Amherst, New Hampshire; graduated at Harvard, 1822. After serving in the state legislature and as speaker of the Lower House, he was elected to Congress, 1837. In 1838 he introduced the famous resolution, 'That all petitions relating to slavery, or its abolition, be laid on the table without debate,' which was passed by 120 to 78. He was elected to the Senate in 1843 and in 1852.

**Atherton**, Gertrude Franklin (maiden name Hern) (1857-1948), Amer. novelist, grandniece of Benjamin Franklin, b. at San Francisco, settled in London, 1895. Her novels, etc., often deal with California as it was at different times, in the nineteenth century especially, and include *The Doomsman*, 1892; *Patience Sparhawk and her Times*, 1897; *A Whirl Asunder*, 1895; *Tower of Ivory*, 1910; *California—an Intimate History*, 1914; *The Living Present*, 1917; *Sleeping Fires*, 1922; *The Immortal Marriage*, 1927; *Dido: Queen of Hearts*, 1929.

**Atlas**, Emmanuel Ben Joseph, a Jewish rabbi and famous printer at Amsterdam, who d. in 1700. With the help of the most distinguished scholars at Amsterdam, he compared the old eds. and MSS. of the Heb. Bible, and pub. a new ed. in 1661, the summaries and preface of which were written by Jan Leusden. A second ed. was pub. in 1667, with many corrections. These eds. of the Bible were more correct than any former eds.; but still they contained errors in the vowel points and accents. A. also printed the Bible in Sp., Hebrew, Ger., and Eng.

**Athletics** in the form of public games have been part of the life of nations from the earliest day. The Gks. were among the first promoters of these festivals and the most celebrated; but they took the games from the Peloponnesians; though the origin of the famous Olympic Games reaches back into remote antiquity prior

to the commencement of the historical era in Greece, and by the Gks. themselves was attributed to a divine source. See OLYMPIA.

The Rom. games were held at the festivals of the gods, but the Gk. ideal became degraded by professionalism. The combats of gladiators were the occasion of national festivals, and fights between wild beasts were very popular. Pompey is said to have set 500 lions to slay 18 elephants, and this took 5 days to accomplish. Chariot races were the sport of the nobility, and the highest in the land took part. The great amphitheatre at Rome was supposed by Aurelius Victor to have seated 87,000 people. The chief games of the Romans were the Apollinarian, the Circensian, and the Capitoline.

Public games in the Middle Ages took the form of tournaments (q.v.), but archery and wrestling were the sport of the people, as the lists were the pastime of the nobility. Henry VIII., however, did not disdain to excel at hammer-throwing or 'casting the barre', but under Edward III. weight-putting was forbidden as interfering with archery. Later under Charles II. professional races for wagers began to be popular, and this aroused amateur enthusiasm, leading to the renaissance of amateur athletics in the nineteenth century. In 1850 a movement was started to organise sports meetings at the colleges of the univs. of Oxford and Cambridge. As a result of this, the first inter-univ. contest took place in 1864, each side winning 4 of the 8 events. Meanwhile the London Athletic Club and others had been formed, and finally in 1880 the need for a central authority gave rise to the Amateur Athletic Association. Since then, the A.A.A. has organised a yearly championship, now held in London.

As regards modern A., we must confine ourselves under this head to the field and track sports. Cricket, football, etc., will be found dealt with under their various heads. Modern A. may be said to have begun with the revival of the Olympic Games (q.v.), celebrated at Athens in 1896 as the result of the activities and enthusiasm of the Baron Pierre de Coubertin. One ideal of his was to promote through sport an international good feeling, but, the First World War having interrupted the quadrennial succession of the games, it was only in the ninth Olympiad of 1928 that Coubertin's idea had begun to be realised. These aims were subordinated in the fifteenth Olympiad at Berlin in 1936 to the propaganda of National Socialism; but a welcome return to the true spirit of the games was a feature of the 1948 Olympiad at London (the first to be held in Great Britain since 1908) when public interest and enthusiasm brought one and a half million spectators.

The eighth Olympiad at Paris in 1924 was remarkable for the performances of Paavo Nurmi, the great Finnish runner, who in that year secured, among the world's records, those for the 5000 metres

with 14 min. 28 sec. and for the 1 m. with 4 min. 10 sec. The 3-, 4- and 5-m. records were also his, but, although he applied for a 10-m. record of 50 min. 15 sec., A. Shrubbs' famous times still held officially for the 6 to 10 m. distances until 1938. In 1926 O. Peltzer, Germany, beat Nurmil over the 1500 metres and set up a world's record for that event of 3 min. 51 sec. Peltzer also secured the half-m. record of 1 min. 51½ sec., and D. G. A. Lowe won for Great Britain the Olympic record for 800 metres with 1 min. 51½ sec. America held the records for the shorter distances from 440 down to 100 yds., the former being run in 47½ sec. by J. E. Moredith in 1916. The present world's running records are as follows: 100 metres: 10½ sec., J. C. Owens, U.S.A. (1936); and H. Davis (1941) (P. Williams, Canada, and E. Tolan and H. Dillard, U.S.A., each 10½ sec., 1930, 1932, and 1948 respectively); 200 metres: 20½ sec., J. C. Owens, U.S.A. (1935); 300 metres: 33½ sec., R. Metcalfe, U.S.A. (1933), and C. W. Paddock, U.S.A. (1921); 400 metres: 46 sec., R. Harbig, Germany, (1939), and G. Klemmer, U.S.A. (1941) (A. Williams, U.S.A., did the distance in 46½ sec. in 1936); 500 metres: 1 min. 14 sec., R. Malett, U.S.A. (1938); 800 metres: 1 min. 46½ sec., R. Harbig, Germany (1939) (S. C. Wooderson, Great Britain, did distance in 1 min. 48½ sec. in 1938); 1000 metres: 2 min. 21½ sec., R. Harbig (1941); 1500 metres: 3 min. 43 sec., G. Haegg, Sweden (1944); 2000 metres: 5 min. 11½ sec., G. Haegg (1942); 3000 metres: 8 min. 14 sec., G. Haegg (1942); 5000 metres: 13 min. 58½ sec., G. Haegg (1942); 10,000 metres: 29 min. 35½ sec., V. Heino, Finland (1944) (T. Maeki, Finland, did the distance in 29 min. 52½ sec. in 1939); 20,000 metres: 1 hr. 3 min. 1½ sec., A. Csaplár, Hungary (1941); 25,000 metres: 1 hr. 21 min. 27 sec., E. Tamilla, Finland (1939); 30,000 metres: 1 hr. 40 min. 57½ sec., J. Ribas, Argentina (1932).

100 yds.: 9½ sec., F. Wykoff, U.S.A. (1930); D. J. Joubert, S. Africa (1931); J. C. Owens, U.S.A. (1935), and C. Jeffrey, U.S.A. (1940); 220 yds.: 20½ sec., J. C. Owens (1935); 440 yds.: 46½ sec., B. Eastman, U.S.A. (1932), and G. Klemmer, U.S.A. (1941); 880 yds.: 1 min. 49½ sec., S. C. Wooderson, Great Britain (1938); 1 m.: 4 min. 1½ sec., G. Haegg, Sweden (1945) (A. Andersson, Sweden, did the distance in 4 min. 1½ sec. in 1944); 2 m.: 8 min. 42½ sec., G. Haegg (1944); 3 m.: 13 min. 32½ sec., G. Haegg (1942); 6 m.: 28 min. 38½ sec., V. Heino, Finland (1944) (T. Maeki, Finland, did the distance in 28 min. 55½ sec. in 1934); 10 m.: 49 min. 41½ sec., V. Heino, Finland (1945) (P. Nurmil, Finland, did the distance in 50 min. 15 sec. in 1928); 15 m.: 1 hr. 19 min. 48½ sec., E. Tamilla, Finland (1937). In 1945 V. Heino ran 12 m. 29 yds. in 1 hr. Nurmil's distance for 1 hr. was 11 m. 1648 yds. in 1928.

*One-M. Records.*—W. G. George's record of 4 min. 18½ sec. in 1884 stood until 1893, when T. P. Conneff (U.S.A.)

did the distance in 4 min. 17½ sec. The gradual succession of records since then is shown in the following list (which is not exhaustive, because the previous record may have been beaten more than once in any given year): F. E. Bacon (Great Britain), 4 min. 17 sec. (1895); T. P. Conneff (U.S.A.), 4 min. 15½ sec. (1895); J. P. Jones (U.S.A.), 4 min. 15½ sec. (1911); J. P. Jones, 4 min. 14½ sec. (1913); N. S. Taber (U.S.A.), 4 min. 12½ sec. (1915); P. Nurmil (Finland), 4 min. 10½ sec. (1923); J. Ladoumégue (France), 4 min. 9½ sec. (1931); J. E. Lovelock (New Zealand), 4 min. 7½ sec. (1933); G. Cunningham (U.S.A.), 4 min. 6½ sec. (1934); S. C. Wooderson (Great Britain), 4 min. 6½ sec. (1937); G. Haegg (Sweden), 4 min. 4½ sec. (1942); A. Andersson (Sweden), 4 min. 2½ sec. (1943); A. Andersson, 4 min. 1½ sec. (1944); G. Haegg, 4 min. 1½ sec. (1945).

*Brit. Running Records (i.e. records made in Great Britain by athletes of any nationality).*—100 yds.: 9½ sec., E. Conwell (U.S.A.), 1947; E. McDonald Bailey (Trinidad), 1946; 220 yds.: 21½ sec., W. R. Applegarth (Great Britain), 1914; 440 yds.: 47½ sec., A. G. K. Brown (Great Britain), 1938, and M. Lanzi (Italy), 1939; 880 yds.: 1 min. 49½ sec., S. C. Wooderson (Great Britain), 1938; 1 m.: 4 min. 6½ sec., S. C. Wooderson, 1937; 2 m.: 9 min. ½ sec., G. Haegg (Sweden), 1945 (C. A. J. Emery, Great Britain, did the distance in 9 min. 34 sec. in 1919); 3 m.: 13 min. 53½ sec., S. C. Wooderson, 1946 (C. A. J. Emery in 1939 did the distance in 14 min. 8½ sec.); 6 m.: 29 min. 22½ sec., V. Heino, 1947 (J. A. Burns, Great Britain, did the distance in 1936 in 29 min. 45 sec.); 10 m.: 50 min. 30½ sec., W. E. Eaton (Great Britain), 1936; 15 m.: 1 hr. 20 min. 4½ sec., F. Appleby (Great Britain), 1902. In 1904 A. Shrubbs (Great Britain) covered 11 m. 1137 yds. in 1 hr.

The U.S.A. holds all the recent hurdling records:—120 yds. (3 ft. 6 in.): 13½ sec., F. G. Towns (1936) and F. Wolcott (1941); 220 yds. (2 ft. 6 in.): 22½ sec., F. Wolcott (1940); 440 yds. (3 ft.): 52½ sec., R. B. Cochran (1942), who also holds 400 metres record, 51½ sec. (1948). Brit. hurdling records:—120 yds. (3 ft. 6 in.): 14½ sec., F. G. Towns (U.S.A.) (1936), and E. H. Lidman (Sweden) (1939) (D. O. Finlay (Great Britain), 14½ sec., 1937); 220 yds. (2 ft. 6 in.): 24½ sec., Lord Burghley (1927); 440 yds. (3 ft.): 52½ sec., N. V. Cochran (U.S.A.) (1939) (Lord Burghley, 53½ sec., 1930). The field events are gradually returning to favour, although jumping has generally been popular. This latter includes high jump, long jump, and pole vault, at all of which America excels. L. Steers having cleared 6 ft. 11 in., J. C. Owens (1935) 26 ft. 8½ in., and C. Warmerdam (1942) 15 ft. 7½ in. at the pole vault. Best Brit. records: high jump, W. Vessie (U.S.A.), 6 ft. 7½ in. (1947); long jump, E. B. Hamm (U.S.A.), 25 ft. 1 in. (1928); pole vault, E. Meadows (U.S.A.), 14 ft. 2 in. (1936). Throwing the hammer, which event goes back to the anc. Celtic Games of Ireland, is performed with a hammer of 16 lb.

weight, attached by a steel wire to a triangular handle, the whole length not exceeding 4 ft. In 1937 P. O'Callaghan (Ireland) made the record throw of 198 ft. 8½ in., but the officially recognised record is 193 ft. 6½ in. by E. Blask (Germany) (1938). Putting the weight, an iron shot weighing 16 lb., is a usual event at meetings; the holder of the record is J. Torrance (U.S.A.), with a put of 57 ft. 1 in. (1934). The discus-throw record is held by R. Fitch (U.S.A.), whose throw, in 1946, was 180 ft. 2½ in. The discus weighs about 4½ lb., is made of wood, and is 8 in. in diameter, with brass plates let into the centre. There are 2 methods of throwing, the free style and the Gk. style; the latter is represented by the statue of the Discobolus.

The tug-of-war has long been a popular contest, and one in which the City of London Police are very proficient. Walking has not been so popular of recent years, as it was a century ago in the time of the famous Capt. Barclay. The record for a 1-m. walk is 6 min. 21 sec., made in 1936 by P. Bernhard (Canada). V. Hardmo (Sweden) holds the walking records for 2, 7, and 10 m., his times being 13 min., 48 min. 53½ sec., and 1 hr. 41 min. 7 sec. respectively. G. E. Larnar (England) holds the Brit. record for 2 m., his time being 13 min. 11½ sec. His time for 1 m. (1904), 6 min. 21 sec., was unbeaten for 32 years. The record for the 100-m. walk is held by T. W. Richardson, who walked the distance in 17 hr. 35 min. 40 sec. in 1936. G. E. Larnar walked 8 m. 438 yds. in 1 hr.

Paper-chases were the origin of cross-country running, but are nowadays rather falling out of public favour, though cross-country races still retain their popularity. The sport is governed by the National Cross-country Union, and the season lasts from Sept. to Mar. In 1912 a cross-country race was included in the Olympic Games, and in 1920 and 1924 this event was won by Nurmi. In 1928 it was omitted as unsuitable for a summer programme.

The ninth Olympiad will be remembered as being the first to include events for women athletes. These were the 100- and 800-metre flat race (the latter won in record time, 2 min. 16½ sec. by L. Radke, Germany), the 400-metre relay race, the high jump, and discus-throw. The best time for 100 yds. is 10½ sec. by F. E. Blankers-Koen, of Holland, in 1944, who also holds the women's record for 80 metres hurdles (with M. Gardner, Great Britain), 11½ sec. (1948). The Women's Amateur Athletic Association was founded in 1922, one year after France had given the lead in women's A. by forming the Fédération Sportive Féminine Internationale. Under the auspices of the F.S.F.I. the first women's Olympic Games were held at Paris in 1924. The chief women's running records are as follows: 60 metres in 7½ sec. in 1933, by S. Walasiewicz (Poland); 100 yds. in 40½ sec. by F. E. Blankers-Koen in 1944; 100 metres in 11½ sec. by H. Stephens (U.S.A.) in 1937;

200 metres in 24½ sec. by F. E. Blankers-Koen (1948); 250 yds. in 24½ sec. by S. Walasiewicz in 1935; and 440 yds. in 50½ sec. in 1932 by H. Halstead (Great Britain); 880 yds. in 2 min. 19½ sec. in 1938 by O. M. Hall (Great Britain). Other records for women are: F. E. Blankers-Koen, high jump, 5 ft. 7½ in. and long jump, 20 ft. 6 in., both in 1943; putting the shot, 47 ft. 2½ in. by G. Mauermeyer (Germany), 1934; javelin, 154 ft. 11½ in. by A. Steinhilber (Germany), 1942; discus, 158 ft. 5 in. by G. Mauermeyer, 1936.

Women's A. are now a recognised institution, having survived much criticism. Men's performances have recently so much improved that those of women have suffered by comparison. But if record-breaking is not the object of sport, any criticism on these lines is misconceived. See H. M. and A. Abrahams, *Training for Athletes*, 1928; Members of the Achilles Club, *Athletics*, 1938; D. G. A. Lowe, *Track and Field Athletics*, 1947; and F. A. M. Webster, *Great Moments in Athletics*, 1947, and *Athletics: Teaching and Training*, 1948.

Athlone, a tn. on borders of Westmeath and Roscommon, Eire, on R. Shannon, 80 m. W. of Dublin. There are manufs. of felts, friezes, and linens. A canal, a m. long, enables steamers to avoid the riv. rapids at this point. The Shannon is crossed by a fine bow-string and lattice iron bridge. The castle was founded in John's reign, and besieged by William III. in 1688, being finally taken by Gen. Ginkell. The tn. is strongly fortified. Pop. 7000.

Athlone, Alexander Augustus F. W. A. G. C., Earl of, Brit. administrator, b. Apr. 14, 1874, at Kensington Palace, third son of the late duke of Teck and late Princess Mary Adelaide. After passing out at Sandhurst, he was commissioned to a Hussar regiment, the Royal Horse Guards, and the 2nd Life Guards, and served with distinction in Matabeleland in 1896 and in the S. African war, 1898-1900. Appointed governor-general of the Union of S. Africa from 1925 till 1931. Governor-general of Canada, 1940-46.

Athlone, Godart Ginkell, Earl of, Dutch general (1630-1703), accompanied prince of Orange to England, 1688; fought in battle of Boyne, 1690, and was made commander-in-chief in Ireland, 1691, when he took Athlone and defeated the Irish. Received his title, 1692. Commanded Dutch in Flanders, 1695-96, and Dutch troops under Marlborough, 1702.

Athol, a tn. of Worcester co., Massachusetts, U.S.A., on Miller's R., 82 m. N.W. of Boston. It has manufs. of boots, cloth and silk, furniture, and tools, and has a public library. Pop. 11,000.

Atholl, a dist. in the N. of Perthshire, Scotland, on the S. slopes of the Grampians. Its chief tns. are Blair Atholl, Pitlochry, and Dunkeld; its lakes, Loch Rannoch and Loch Tummel, are famous for their beauty. The head of the Murray family is duke of Atholl.

Atholstan, Sir Hugh Graham, first Baron, of Atholstan, Quebec (1848-1938), Canadian newspaper owner. Founder and



president of the *Montreal Evening Star*. Knighted in 1908 for his public services. Most zealous in connection with the dispatch of the Canadian contingent in the Boer war. Canadian delegate to the Imperial Conference in 1909. Raised to the peerage as a baron of the United Kingdom in 1917. Took his seat in the House of Lords, 1920.

**Athor, or Hathor**, queen of heaven, an Egyptian goddess, daughter of Ra; the female counterpart of Osiris, and with a close affinity to Isis. She was symbolised by a cow, and worshipped throughout Egypt under many local forms and names.

**Athos**, a mt. of Greece, at the extremity of the most E. of the 3 tongues of the Chalcidice Peninsula, on the Aegean Sea. It is about 6350 ft. in height. The name is also applied to the whole tongue of land, which is connected with the mainland by an isthmus just over a m. broad. The peninsula is about 30 m. long and 3-6 m. wide. There are still traces of a canal cut through the isthmus by Xerxes to avoid the dangerous promontory. Since the Middle Ages Mt. A. has been the seat of a monastic republic. It was a medieval centre of Gk. theology and learning, and the remains of magnificent libraries exist. There are now 20 Gk. monasteries and numerous chapels and hermitages on the peninsula, with a pop. of about 6000 monks.

**Athy**, a tn. of Kildare, Eire, at the junction of R. Barrow and Grand Canal, 40 m. S.W. of Dublin. There are manufs. of bricks and tiles. It was the site of a great Irish tribal battle in the third century. The tn. grew up round the monasteries of the Crutched and Dominican friars, and was plundered by the Scots in 1515 after the battle of Ardsnull. Pop. 3000.

**Atitlan**, lake of Guatemala, Central America. It is 4700 ft. above sea-level, 24 m. long and 10 m. wide, with a circumference of 84 m., surrounded by mts., very deep, and with no visible outlet.

**Atkarsk**, a tn. of Saratov, Russia, on R. Atkara. Has a trade in grain. Settled in fourteenth century. Pop. 15,000.

**Atkins**, Tommy, slang term for the Brit. private soldier. Its origin is similar to the use of 'M. or N.' by the Church, or 'John Doe and Richard Roe' by lawyers, as it was the name selected by the War Office to fill in the specimen form of a manual distributed throughout the Army, in which were to be entered details concerning each man.

**Atkinson**, Sir Harry (1831-92), a politician. In 1855 went to New Zealand, where he soon distinguished himself. He became captain in the Waitara war, 1860-64, and minister of defence in the Cabinet of Sir Frederick Aloysius Weld, 1864-65. He was 3 times prime minister of New Zealand, and 4 times colonial treasurer.

**Atkinson**, John (1835-97), Amer. Methodist Episcopal preacher, b. at Deerfield, New York. He wrote the well-known hymn *We shall meet beyond the River*, and historical works on Methodism.

**Atkyns**, Richard (1615-77), typographical writer. Famous for his broadside *The Origin and Growth of Printing*, 1664, in which he tried to estab. that printing was a Crown monopoly, and endeavoured to secure the office of patentee for himself.

**Atlanta**, cap. city of Georgia, U.S.A., and co. seat of Fulton co. in the N.W. part of the state. It is the seat of Clark and A. Univs. While it has considerably developed as an important manufacturing city, it is even more important as the distributing centre for the S. Many of the great industries of the N. have depots here, and it is also a kind of insurance cap. for the S. As a consequence, it is a city of skyscraper office buildings. Settled in 1840, it was besieged and captured by the Union troops under Gen. Sherman in the Amer. Civil war and the business section was destroyed. Its growth at the end of the nineteenth century was rapid. Its pop. in the 1940 census was 302,000, but with the near-lying tns., which are really its suburbs, Greater A. has a total pop. of 390,000.

**Atlantes**, an architectural term designating male figures used as columns to support cornices, architraves, etc.

**Atlantic**, a city and co. seat of Cass co., Iowa, U.S.A. Manufs. canned corn, drugs, bricks, and umbrellas. Pop. 6000.

**Atlantic**, Battle of the, a compendious name given to the Ger. U-boats' assault, in the Second World War, on Brit.—and later, allied—sea power and its defeat. It was a long-drawn-out battle, fought with skill and determination on both sides, and it is described in a comprehensive popular account issued in 1946 by the Admiralty and the Air Ministry entitled *The Battle of the Atlantic*. This account conveniently distinguishes 8 separate phases of the struggle, taking in the Indian as well as the A. Ocean. In the first phase, from the beginning of the war to June 1940, sinkings of Brit. ships were not very numerous, for Germany then possessed only 57 operational boats, while Britain was ready to put a convoy system into force from the start. The sinkings were scattered off the W. approaches to the Eng. Channel and bay of Biscay, with a few in the North Sea, while but few U-boats were sunk. In the second phase, June 1940—Mar. 1941, things became rapidly worse; for U-boats were rapidly increasing in numbers, and Britain was very short of escort craft, while the Gers. were using long-range aircraft in collaboration with submarines. The area of destruction shifted to the N.-westward of the Brit. Isles, where the circles on the illustrative charts (issued with the official pamphlet) indicating merchant losses are clustered thickly, while there is still hardly a cross-indicative of U-boat sinkings—to be seen. Air escort, however, was being developed by Britain and, in the third phase, up to the end of 1941, crosses are dotted all over the E. half of the A. from Greenland to the Equator and the W. African coast. The fourth phase (Jan.-July 1942) saw America's

entry into the war, with consequently high losses among the dense sea traffic of the Caribbean and U.S. seaboard, where full defence was yet to be organised. The whole area of Ger. submarine activity now shifted to the W. half of the A., leaving the E. half almost free. But there were sinkings in the Arctic, on the convoy route to Russia, in the S. A., and in the Indian Ocean. In the fifth phase, Aug. 1942-May 1943, the Amer. E. coast had been cleared, though there were still substantial losses in the Caribbean, the chief source of allied fuel supplies. With the allied landing in N. Africa Ger. U-boats came into the Mediterranean, where an increasing number of them were destroyed; while the development of air collaboration in convoy defence had driven U-boat A. activity out into the gap that could not be covered by air patrols from Britain, Iceland, or Newfoundland. Hence this gap is shown on the chart to be densely studded with circles, though the crosses showing U-boat destructions are increasing in all parts. The introduction of escort carriers, however, had an immediate effect which is obvious in the chart of the sixth phase, June-Aug. 1943; for there were now hardly any sinkings of ships in the N. A., while the approaches to the bay of Biscay are studded with the destruction of U-boats, aircraft of Coastal Command (*q.v.*) taking heavy toll of the enemy as they tried to pass through to the operational bases in France. In this phase for the first time in the battle more Ger. submarines were sunk than merchant ships; the tide of battle had turned. In the seventh phase, in which Italy had surrendered, and the Mediterranean route was re-opened, the N. A. was thickly studded with U-boat sinkings, while merchant vessels were sunk only in the outer oceans. But the enemy was now pinning his faith to the new devices already in preparation. The eighth and last phase began with the allied invasion of Normandy. The Gers. placed great reliance on the ability of their submarines to impede the Channel crossing, but they were forestalled by the massive air offensive against them, by which the Channel approaches, through which their submarines had to pass from their bases on the Fr. A. coast to reach the place of the allied landing, were so closely patrolled by Coastal Command aircraft and escort groups co-operating with them that not a U-boat got through. *See further under NAVAL OPERATIONS IN SECOND WORLD WAR.*

**Atlantic Charter** (or **Eight Points**), the popular name given to a joint declaration of peace aims by Mr. Winston Churchill, Brit. Prime Minister, and President Roosevelt, in Aug. 1941. The declaration opened with the general statement that the signatories 'deemed it right to make known certain common principles in the national policies of their respective countries on which they based their hopes for a better future for the world' and then proceeded to specify the principles as follows: *First*, their countries

sought no aggrandisement, territorial or other; *second*, they desired to see no territorial changes that did not accord with the freely expressed wishes of the peoples concerned; *third*, they respected the right of all peoples to choose the form of gov. under which they would live; and they wished to see sovereign rights and self-gov. restored to those who had been forcibly deprived of them; *fourth*, they would endeavour, with due respect for their existing obligations, to further enjoyment by all states, great or small, victor or vanquished, of access, on equal terms, to the trade and to the raw materials of the world which were needed for their economic prosperity; *fifth*, they desired to bring about the fullest collaboration between all nations



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#### ATLANTIC CHARTER

President Roosevelt and Mr. Churchill.

in the economic field, with the object of securing for all improved labour standards, economic advancement, and social security; *sixth*, after the final destruction of Nazi tyranny, they hoped to see established a peace which would afford to all nations the means of dwelling in safety within their own boundaries, and which would afford assurance that all the men in all the lands might live out their lives in freedom from fear and want; *seventh*, such a peace should enable all men to traverse the high seas and oceans without hindrance; *eighth*, they believed all of the nations of the world, for realistic as well as spiritual reasons, must come to the abandonment of the use of force. Since no future peace could be maintained if land, sea, or air armaments continued to be employed by nations which threatened, or might threaten, aggression outside of their frontiers, they believed, pending the establishment of a wider and permanent system of general security, that the disarmament of such nations was essential. They would likewise aid and encourage all other practicable measures which would lighten for peace-loving peoples the crushing burden of armament.

The significance of this declaration lay

in the fact that belligerent Britain and non-belligerent America found themselves identically minded about the principles that must determine the peace and the shape and structure of the world which that peace would largely re-create. It is to be observed that the essentially Wilsonian 'self-determination' doctrine (see FOURTEEN POINTS) which is, curiously enough not to be found in the Fourteen Points, is explicitly set forth in the A. C. (third point). Wilson also demanded that the world should be made fit and safe to live in (cf. point six above) and, for the rest, disarmament is also to be found in both documents; and equally, economic equality and the destruction of trade barriers; the freedom of the seas and, though in different language, the creation of 'a general association of nations' (Wilson) or a 'wider and permanent system of general security' (Roosevelt-Churchill).

Atlantic City, co. seat of A. co., New Jersey, U.S.A. Most celebrated seaside resort in the U.S.A., it is situated on an ls. 60 m. S.E. of Philadelphia. Its close proximity to this city and to New York and its splendid railroad connections with the rest of the U.S.A. assure it an enormous all-the-year-round patronage. It has one of the finest bathing beaches in the world. It boasts the longest boardwalk on earth. This walk, which is a very extensive promenade, is faced on one side by the sea and on the other by many magnificent seaside hotels, some of which are of skyscraper size. Pop. 64,000.

**Atlantic Flights.** During the decade after the First World War repeated attempts to cross the A. by aeroplane were made. Sev. flights were successful, but the majority ended in the loss of the aviators. Flying a Sopwith-Rolls-Royce plane, Harry C. Hawker, pilot, and Commander Mackenzie Grieve, R.N., navigator, started from St. John's, Newfoundland, on the evening of May 18, 1919, the proposed route being to a point on the Galway coast, a distance of 1880 miles. To improve his chances, Hawker, just before reaching the sea, dropped the under-carriage of his machine, including the wheels, to lighten the load. No news reached England of the progress of this flight for a week, and it was assumed that it had ended fatally. But on May 19 a cable ship sighted the machine's red light in 50° 28' N. lat., 30° 2' W. long., some 150 m. N. of the main steamer routes and 900 m. out of the direct course between St. John's and Galway. On May 25 a Dan. steamer, *Mary*, reported that she had picked up the crew of the machine, who had been in the water for about 90 min. before rescue. The plane was then in lat. 50° 20' N. long. 29° 30' W., 1100 m. from Newfoundland and 750 from Ireland, the engine having failed through mechanical defect. Simultaneously with this attempt, 3 Amer. seaplanes, N.C. 3, N.C. 4 and N.C. 1, started from Trepassay Bay, Newfoundland, on May 15 at 11 p.m., the proposed route being via the Azores to Lisbon

and thence to England, a distance of 3368 m. The only machine to complete the distance was N.C. 4, piloted by Lt.-Commander Read, U.S. Navy, who reached the Azores at 2.25 p.m., May 16, but remained some time there, only reaching Plymouth on May 31. The third attempt, which proved entirely successful, was begun June 14 at 4.28 p.m., by Capt. John Alcock, pilot, and Lt. Whitten Brown, navigator, in a Vickers-Vimy machine, and the journey from St. John's to Clifton, Galway, about 1880 m., was accomplished in 16 hrs. 12 min., the plane landing in a bog at 8.40 a.m., June 15. The mean speed was somewhat over 120 m.p.h., and for the greater part of the distance the plane was at an altitude of 4000 ft. Practically the whole time the aviators were either in a fog or flying between banks of fog, so that readings of his position by Lt. Brown were rarely possible.

Other competitors were forthcoming for the prize of £10,000 offered by the *Daily Mail* for a transatlantic flight, but mishaps or bad weather prevented them from starting. The flight of the Amer. seaplanes which was organised by the U.S. Navy administration did not come within the conditions of the newspaper prize competition, which eventually went to Capt.—later Sir John—Alcock; but the flight of the Amer. seaplanes was organised with much precision and was most useful as pioneer work. No other attempts were made to cross until the year 1927, when, on May 20, Capt. (later Col.) Charles Lindbergh, an Amer. air-mail pilot, left Long Is. alone at 12.31 p.m. in his monoplane *Spirit of St. Louis*, and landed at Le Bourget aerodrome near Paris at 10.22 p.m., May 21, having crossed in a little over 33 hrs., covering about 3000 m. Just prior to this success Capt. Nungesser, the Fr. aviator, with a fellow countryman, Capt. Coll, attempted the flight from E. to W. in a Levasseur biplane, but no trace was afterwards found of them. In June 1927, 2 other Amers., Mr. Chamberlain, an airman, and Mr. Levine, left New York in a Wright monoplane of 200 h.p. and crossing the ocean alighted at Eisleben, Germany, a distance of about 3900 m. In just over 42 hrs. These successes acted as a spur to many subsequent aspirants, but it is evident that insufficient regard was paid to the vagaries of wind and weather, for many perished. In the late summer of 1927 Col. B. Minchin, Capt. L. Hamilton, and Princess Löwenstein-Wertheim tried to cross from E. to W., but were lost. Commander (now Rear-Adm.) Byrd (q.v.) with 4 passengers, flew from New York to Ver-sur-Mer, France, June 29–July 1, 1927, a distance of 3744 m., in 46 hrs. 6 min., coming down safely near the coast after flying many hrs. over France in a fog. The earliest successful E. to W. flights were those of W.C. Kingsford Smith, who, with companions, crossed from Portmarnock, Dublin, to Newfoundland in June 1930, and of Capt. Coste and M. Bellonte, who

in Sept. of the same year flew from Le Bourget to New York.

The first transatlantic flight with a full complement of passengers was made by the Boeing flying-boat of Pan-Am Airways, the *Fankee Clipper*, which left Baltimore Harbour on Mar. 26, 1939, on a survey flight, and arrived at Horta, Azores, on Mar. 27, covering the distance of 2448 m. in 17 hrs. 32 min. The flying-boat carried a crew of 11 and 10 passengers.

Negotiations for the long-projected airmail service across the A. between the United Kingdom, U.S.A., and Canadian Govs. were completed in 1935. Trial flights were made by the United Kingdom flying-boat *Caledonia* in 1937 and by the *Cambria* later in the same year. This Imperial Airways boat averaged 190 m.p.h. for the whole journey, her flying time from Botwood, Newfoundland, to Foynes, Ireland, being 10 hrs. 33 min. Further experimental flights were made in 1939. See further under AIR MAIL.

**Summary of Transatlantic Flights.**—The following have flown the Atlantic, in the year stated: 1919: Alcock and Brown; 1927: Lindbergh; Chamberlin, and Levine; Commander Byrd (in monoplane *America*, which came down in the sea 200 yds. from the beach at Ver-sur-Mer, France; Brock and Schlee (Amer.) (reaching Croydon); 1928: Fitzmaurice, with the Gers. Kohl and von Hunefeld (first E. to W. crossing); Amelia Earheart, with Wilmer Stultz (pilot) and a mechanic (later she was the first woman to make a solo flight); 1929: Yancey and Williams, (left Old Orchard (Maine) for Rome, but, short of petrol, landed in Spain); Assolant and Lefèvre (from Maine to Spain, with a stowaway); 1930: Kingsford Smith (*Southern Cross* monoplane, from Ireland to Newfoundland); Coste and Bellonte (Fr. airmen, made the first flight to end at New York, flying 3700 m. in 37 hrs.); Capt. Boyd and H. Connor (from Newfoundland, landing on one of the Scilly Isles in 24 hrs.); 1931: Hillig and Holris (Dan.) (from Newfoundland to Krefeld, Germany); Pangbourn and Herndon (Amer.); Post and Matty (made a record A. crossing during a round-the-world flight); Magyar and Endresz (Hungarian); Boardman and Polando (set up long-distance flight record—4984 m.); 1932: J. A. Mollison (from Portmarnock, Dublin, to Lennfield Ridge, New Brunswick); J. A. Mollison and Amy Johnson (crashed at Bridgeport, Connecticut); Wiley Post (solo round-the-world flight) (killed in 1935); Codos and Rossi (New York to Paris in 54 hrs. 44 min.) (in the following year they flew from Paris to California); Mattern and Griffin (speed record); 1934: J. and B. Adamowicz (Poles), (from Newfoundland, coming down at Fliers, near Paris); Poma and Sabelli (forced down in Glamorgan); 1935: Waitkus (Lithuanian), (from New York to Ireland); 1936: Hitchman and Merrill (double Atlantic flight); Mrs. Markham (first woman to fly from E. to W., landing at Cape Breton); 1937: Merrill and Lambie

(double flight—Brooklyn to N. Weald and Southport to Quincy); Pan-Am. *Clipper III* (from Botwood, Newfoundland, to Foynes (Ire), under Capt. Gray); Brit. flying-boat *Caledonia*, under Capt. A. S. Wilcockson, flying from Foynes to Botwood—simultaneously with the W. to E. flight of the Amer. *Clipper IV*. Each machine made a return flight; flying-boat *Cambria* (Newfoundland to Foynes, under Capt. G. J. Powell, 10 hrs. 36 min., the fastest A. air crossing to that date—Sept. 28); 1938: H. Hughes (reaching Le Bourget); Corrigan (New York to Baldonnell, Ireland); *Mercury* (being the upper component of the Mayo composite aircraft) crossed from Foynes to New York in 13 hrs. 29 min.—fastest E. to W. passage: *Brandenburg*, under Capt. Alfred Henke (Ger. air-liner, from Berlin to New York, and returning). The Ger. airship *Graf Zeppelin* made crossings in 1928 and 1931. In a non-stop flight of 3100 m. from Montreal to an airport on the W. coast of Britain in 11 hrs. 35 min., Capt. Richard Allen eclipsed all long-distance and transatlantic air-speed records when flying a B24 Liberator on the R.A.F. Transport Command, N. A. shuttle ferry for Brit. Overseas Airways Corporation (Nov. 29, 1943). His time was 21 min. shorter than the previous best in Oct. 1943, by a Brit.-built Lancaster piloted by Capt. M. B. Barclay of Perth, Scotland, on the Canadian Gov. A. service operated by Trans-Canada Air Lines. The best time in a Liberator before this flight was 12 hrs. 51 min. by Capt. S. T. B. Cripps, of Brit. Overseas Airways Corporation. In Nov. 1944 the time was reduced to 10 hrs. 13 min. by Capt. G. B. Lothair in a Lancaster from Montreal to Britain. In the same month—Capt. E. M. Gill, R.A.F. Transport Command, crossed the A. in a Canadian-built Mosquito (2230 m.) in 6 hrs. 8 min. On Mar. 30, 1945, F./Lt. H. C. Graham flew from Newfoundland to Scotland (2184 m.) in 5 hrs. 30 min. The fastest E. to W. A. crossing was made on Sept. 6, 1945, by an R.A.F. Mosquito which flew from Mawgan (Cornwall) to Torbay, Newfoundland, in 7 hrs. 2 min., piloted by W./C. J. R. H. Merfield. Brit. Overseas Airways claimed a record for the flight from New York to Shannon (Dec. 2, 1946) by a Bristol 11 (pilot Capt. B. C. Frost), which covered the 3,200 miles in 8 hrs. 32 min., or at an average speed of 375 m.p.h. See also under AERONAUTICS.

**Atlantis Monthly**, an Amer. review, founded at Boston in 1857. Its contents were somewhat similar to, though rather more purely literary than, those of its famous and older rival the *North American Review*. James Russell Lowell at one time was editor, and the magazine was directed by William Dean Howells, 1865–81, while among the most famous contributors have been Longfellow, Oliver Wendell Holmes, and Whittier.

**Atlantic Ocean**, one of the 5 great hydrographical divs. of the world, named after either Mt. Atlas or the mythical Atlantis, and, lying as it does between

Europe and Africa on the E. and N. and S. America on the W., dividing the Old and New Worlds. It stretches from about 70° N. to 40° S., from the Arctic to the Antarctic Ocean, and is usually taken as being divided by the Equator into the N. A., with an area of about 14,000,000 sq. m., and the S. A., with an area of about 10,100,000 sq. m. The breadth varies from 4500 m. between the Saharan coast and Florida, to 16,000 m. between the Guinea coast and Brazil. It communicates with the Baltic and Mediterranean Seas, and among the smaller seas and gulfs forming part of it are the North Sea, the Irish Sea, the Caribbean Sea, the bay of Biscay, the gulf of Guinea, the gulf of Mexico, and the gulf of St. Lawrence. Continental is. are numerous, including the Brit. Isles, the W. Indies, Newfoundland, and the Falklands; among the comparatively few oceanic is. are Iceland, the Azores, St. Paul's Rocks, Ascension, Tristan da Cunha, Jan Mayen, the Bermudas, the Canaries, the Cape Verdes, Madeira, Fernando Noronha, Trinidad, and St. Helena. The A. receives the drainage of almost all W. Europe, most of Africa, N. America E. of the Rockies, and S. America E. of the Andes, the chief riv. systems flowing into it being those of the Rhine, Loire, Tagus, Senegal, Niger, Congo, St. Lawrence, Mississippi, Orinoco, Amazon, and La Plata.

The average depth of the A. is 2200 fathoms (2-3 m.), the bed being usually a gently undulating plain. A low submarine ridge, over which the average depth is 1700 fathoms, runs approximately down the centre from N. to S. There is a considerable E. to W. extension of this ridge between Ireland and Newfoundland, along which the chief cables have been laid, and on both sides of the main elevation are to be found the greatest depths, often between 3000 and 4000 fathoms, while the Nares Deep, N. of the Virgin Is., reaches 4561 fathoms. There are sev. large sandbanks rising to within a few fathoms of the surface, the chief of these being the Newfoundland, the Dogger, and the Agulhas Banks. The continental shelf all round the A. is narrow and falls away in a steep slope. The surface temp. varies from about 85° F. at the Equator to 40° F. in the N. and S. temperate regions, and the bottom water temp. averages about 35° F. The water is saltiest (density over 1.0275) in the trade-wind regions, and least in the belt of equatorial calms, always increasing in salinity below the surface.

The trade winds, which determine the course of the ocean currents, take their rise in high-pressure areas in the middle of both N. and S. As. The S.E. and N.E. trades produce the warm equatorial current, which divides at Cape St. Roque and flows S. as the Brazil current and N. through the Caribbean Sea and gulf of Mexico, emerging as the Gulf Stream, which has an enormous influence on the climate of N.W. Europe. A cold current flows E. from the Arctic Ocean, and, as the Labrador current, passes beneath the

Gulf Stream off the Newfoundland Banks. The N. A. current leaves a patch of central calm, between 40° and 75° W. and 20° to 35° N., which is occupied by the Sargasso Sea, in which are enormous floating banks of gulf-weed. The surface waters teem with animal and vegetable life, which decreases in mid-ocean and at great depths. It is rich in edible fish, and herring and cod fishing form important industries on both the Amer. and European shores of the N. A.

The A. is the great commercial highway of the world, its shores being inhabited by the most civilised nations in existence. The chief danger to navigation is the presence of floating ice, which is carried N. from the Antarctic to 38° S., and S. from the Arctic to 40° N., thus interfering with the great steamship route between England and N. America. This crossing can now be made in under 4 days, indicating the enormous progress in navigation since 1620, when the *Mayflower* took 106 days for the journey. There are now numerous trans-A. submarine cables and others along the shores connecting important ports, while wireless telegraphic stations are working in Cornwall and Nova Scotia. See *Reports on the Scientific Results of the Voyage of H.M.S. 'Challenger'*, ed. by Sir Wyville Thomson and Dr. John Murray, 1880-89 (37 vols.), and *Results of a Deep-Sea Sounding Expedition in the North Atlantic during the Summer of 1899*; Royal Geographical Society: *Supplementary Papers*, 1910; J. Murray and J. Hjort, *The Depths of the Ocean*, 1912; C. C. Howell, *Ocean Research and the Great Fisheries*, 1921; F. C. Bowen, *Century of Atlantic Travel, 1830-1930*, 1932.

**Atlantic Pact**, see North Atlantic Treaty and Europe, *History*.

**Atlantic Passage Records**, the first recorded crossing by a sailing vessel was of course, that by Christopher Columbus, who, in 1492, reached Guanahani in 70 days. The first crossing by a steam-boat was made by the *Sirius* in 1838 in 19 days. The *Great Western* was the first steam-boat built for a regular transatlantic service, and indeed only failed, by a few hours, to forestall the *Sirius*. The fastest crossings to date are those of the *Queen Mary* in 1938 (3 d. 21 h. 45 min. and 3 d. 20 h. 42 min.). Other fast crossings: *Mauretania*, 4 d. 10 h. 41 min. in 1909; *Europa*, 4 d. 17 h. 6 min. in 1930; *Europa*, 4 d. 15 h. 56 min. in 1932; *Bremen*, 4 d. 17 h. 43 min. in 1933; *Empress of Britain*, 4 d. 6 h. 58 min. in 1934; *Normandie*, 4 d. 3 h. 2 min. in 1935; *Queen Mary*, 3 d. 23 h. 57 min. in 1936; *Normandie*, 3 d. 23 h. 2 min. The record crossings by the *Queen Mary* in 1938 and that of the *Normandie* in 1937 were all made from Bishop Rock to Ambrose Light—a distance of 2907 m. The *Queen Mary's* second 1936 voyage was 2938 m.

**Atlantic Shipping Trust**, or 'Morgan Combine,' a popular expression for the International Mercantile Marine Company, organised in 1902 by Mr. J. Pierpont Morgan, to control the chief Brit.

and Amer. N. Atlantic steamship companies. In 1902 provisional agreements were entered into for the acquisition before the end of the year of the White Star Line, the Dominion Line, and the Leyland Line (Brit.), and the Amer. Line and A. Transport Line (Amer.), by a corporation of which the total capital stock amounted to £120,000,000. By this agreement Brit. ships were to sail with Brit. registers and have Brit. officers and crews. The combination was incorporated at Trenton, New Jersey. The Brit. Gov. also entered into agreements with Mr. Morgan by which it was secured that Brit. companies in the combination should remain Brit. The agreements were to hold good for 20 years, and were finally ratified in 1903. In 1927, during the great post-war slump in shipping, the International Mercantile Marine Company decided to dispose of part of their holdings. The White Star Line and the Shaw, Savill & Albion Company, together with the Aberdeen Line, were sold to the great Brit. combine headed by Lord Kylsant.

**Atlantic Star**, Brit. decoration to commemorate the battle of the A., designed primarily for convoys and their escorts and anti-submarine forces, as well as for fast merchant ships that sailed alone. The ribbon is blue, white, and sea-green, shaded and watered. The star is granted for 6 months' service afloat in the Navy in the A. and home waters since Sept. 3, 1939, and until May 8, 1945. The Merchant Navy is awarded the star under the same conditions as the Navy, except that 6 months' service anywhere at sea qualifies, provided that one or more voyages were made in the defined area. Air crews of the R.A.F. are also eligible for the award.

**Atlantic Telegraph** (see TELEGRAPHY). The idea of a transatlantic cable was first mooted by Morse, in 1843. A company, formed 1856, laid a cable in 1858, which soon broke down. Another, laid in 1865, broke, and the first real success was made in 1866.

**Atlantic Transport Company**, running between London, Philadelphia, and New York, and mainly carrying refrigerated meat and live stock. The present company, formed in 1889, includes the ships of the National Steamship Company, the Wilson Line, and the Furness-Leyland Line. The vessels of the company fly the Brit. flag, but the combine was largely financed by the U.S.A. The 2 finest vessels of this company are the *Minnetonka* and the *Minneapaca*, each of about 22,000 tons gross. These sister ships were built, respectively, in 1924 and 1923. Their length is 600 ft., and they have a speed of 16½ knots. Their funnels are red with black top, and they are fitted to burn liquid fuel.

**Atlantis**, an anc. mythical is., supposed to lie in the Atlantic, W. of the Straits of Gibraltar. It is described by Plato in the *Timæus* and the *Critias*, where it is stated that Solon was told of its existence by an Egyptian priest. Plato represents it as having been en-

gulfed in the sea 9000 years previously as a punishment for the impiety shown by the inhab. in waging war against Athens. A shoal of mud still marked its site. It has been variously identified with the Canaries, America, and Scandinavia, but is probably only a Gk. form of the Celtic Island of the Dead, always placed in the W. Ocean.

**Atlantosaurus** (Gk. Ἀτλας, σαῦρος, lizard), a fossil genus of reptiles containing the most gigantic of animals ever known to exist, being estimated at 115 ft. in length. This Dinosaur was herbivorous and 4-footed, the tail was long and head minute. Remains are found in the Jurassic strata of N. America.

**Atlas**, in Gk. mythology, one of the Titans, son of Iapetus and Clymene. He led the Titans against the gods, and was therefore condemned to stand near the Hesperides and bear the heavens on his shoulders. According to another legend, he was turned into Mt. A. by Perseus with the Gorgon's head. The term is also applied to the highest vertebra of the spinal column, and to a collection of maps, having been first used in this latter sense by Mercator in the sixteenth century.

**Atlas Mountains**, a great mt. system of N.W. Africa, stretching N.E. from Cape Nun in Morocco to Cape Bon in Tunis. For the most part there is no continuous chain, but an irregular mass of mountainous land, including vast plateaux and highlands. They may be roughly divided into (1) the Moroccan A., and (2) the Tunisian and Algerian A., both containing numerous minor divs. In (1) there are 4 main chains: (a) the Great A., containing the peaks of Tizi Likumpt (13,151 ft.), Tizi Tamjurt (14,500 ft.), and Miltain (11,430 ft.); (b) the Middle A., to the N. of (a); (c) the Anti-A., connecting with (a) near the peak of Sebel Ayashin (12,000–14,000 ft.); (d) the Jebel Bane, to the S. of (c). In (2) there are 2 main ranges: (a) the Great A., containing the peak of Sheliya (7760 ft.), and (b) the Little A., containing the peak of Lella Khedija, the two being separated by a plateau. The A. Mts. are non-volcanic, and only very few summits are perpetually covered with snow. The valleys are very fertile, and the lower slopes covered with forest. The dist. is difficult of penetration, except in Algeria, where there are some excellent military roads. The geological formation of the mts. is crystalline rocks and schist, with flanking of limestone. The mineral wealth is as yet practically unworked.

**Atlixco**, a tn. of Mexico, 16 m. S.W. of Puebla, situated at an altitude of 5460 ft. in a fine fruit-growing dist. Pop. 10,000.

**Atmolysis**, a method of separating gases of different densities by passing them through a porous tube or diaphragm. Let a tobacco-pipe stem be cemented into an outer glass tube so that its ends project, and let the outer tube be exhausted by an air-pump. If a slow current of air be passed through the pipe, the nitrogen diffuses through the porous clay quicker

than the heavier oxygen, so that the air emerging is richer in oxygen than ordinary air. By repeating the process with the same gas a number of times, a fairly pure supply of oxygen is obtained.

**Atmometer**, an instrument used to determine the amount of water passing into the air by evaporation. It consists of a hollow ball of unglazed clay fitted with a narrow glass tube. The instrument is filled with water and inverted with the glass tube dipping into a mercury bath. As the water percolates through the porous clay and is evaporated into the atmosphere, the mercury rises in the glass tube, and the level of the mercury gives a rough indication of the humidity of the atmosphere.

**Atmosphere**, the gaseous covering or envelope of the earth or any other planet, extended to mean the somewhat indefinite influence surrounding a person or thing. The earth's A. is the remainder of the collection of gaseous matter, part of which has cooled down to form the earth and sea. The gaseous constituents still unliquefied are a mixture of gases comprising about 21 per cent of oxygen, 78 per cent of nitrogen, 1 per cent of argon and other gases, and a slight trace of carbon dioxide. If the air is moist, it contains aqueous vapour to a limit of about 3 per cent. Other ingredients are found in particular localities; gaseous compounds of sulphur and nitrogen in fens, salt at the seaside, and everywhere dust composed of inorganic particles, decaying organic matter, tiny seeds and pollen from plants, and countless bacteria of all sorts.

The oxygen of the A. is breathed into the lungs of animals and enters the gills of fishes after absorption by the water, and it is constantly entering into combination with other substances by combustion or the slower processes of oxidation, as in rusting iron. The animals breathe out carbon dioxide, and combustion of carbon compounds sets free a great amount of the same gas, so that if there were no opposing influences at work, the air would quickly become too much vitiated to sustain life. All plants with green colouring matter, however, are able to absorb carbon dioxide, utilising the carbon to build up their tissues, and setting free most of the oxygen to preserve the balance in the A. Carbon dioxide is also more soluble in water than oxygen, so that any greater pressure of the former gas causes increased absorption by all water surfaces, thus tending to keep the proportions constant. Nitrogen serves as a diluent for oxygen in breathing, and is converted by lightning flashes, and to some extent by certain bacteria in the roots of leguminous plants and in the soil, into compounds necessary for most forms of plant life. Argon (q.v.) is a remarkably inert gas, discovered in 1894, and is accompanied in the air by smaller quantities of similar gases, viz., helium, neon, krypton, and xenon.

The height to which the A. extends is not absolutely known, but it exerts a

pressure of about 14·7 lb. on every sq. in. of surface. Our bodies have an internal pressure which in ordinary circumstances exactly balances atmospheric pressure, and is therefore not felt by us. Similarly, fish that live in the ocean depths are adapted to sustain the correspondingly great pressure, so that if they are brought to the surface they explode. There are, however, certain variations of pressure caused by the variations of heat-expansion of the air, and the consequent currents, whirlpools, and cyclones (*see* METEOROLOGY).

**Atmospheric Railway**, *see* RAILWAYS.

**Atoll** is the name of a type of coral is. consisting of low circular coral reefs, which form a ring of land around a central lagoon. Their origin was for long an enigma, as they rise abruptly from ocean floors of a depth far exceeding that at which the coral insect can live. They are found in the tropical Indian and Pacific Oceans. It was formerly thought that the A.s. were so shaped because they had grown upon the ruins of submerged volcanic craters; but their size and irregularity of shape, and the fact that no volcanic rocks were found in their neighbourhood, disproved this hypothesis. Darwin's explanation is now generally accepted. They are, according to him, due to the upgrowth of coral reefs over ls. that have gradually subsided at a rate no greater than the upward building of the coral. Thus the A. began as a fringing reef, and then became a barrier reef as the land slowly subsided.

**Atom and Atomic Theory**. *Atom* (Gk. *ἄτομος*, indivisible) is the name given to the smallest particle into which matter could, until recent times, be divided. Among the ancients, there were 2 theories as to the nature of matter, or substance. Some, such as Anaxagoras and Aristotle, held that matter was infinite and continuous, and that therefore any substance could theoretically be divided and subdivided to an infinite extent. Others, such as Epicurus and Democritus, taught that matter was *grained*, that is, consisted of minute particles which could not be divided. Both theories were based on naturally slender experimental evidence. The question has its interest in the domains of chem. and physics, and different conceptions of the nature of the smallest particles of matter have arisen to explain chemical and physical phenomena respectively.

**Atomic Theory**.—Towards the end of the eighteenth century the development of experimental chem. led to a desire for greater quantitative exactness. The theory of 'phlogiston' had been held to explain many chemical changes. In combustion, for example, the burning body gave forth 'phlogiston,' which was regarded as an element and therefore as transferable from one body to another. The effect of weighing the products of combustion was, however, to show that weight was gained and not lost. About this time Priestley discovered oxygen, and a new light was thrown on the phenomena of combustion. The idea gradually

prevailed that the combined weight of the substances concerned in chemical change was not altered at any stage of the process; that is, if all the substances are weighed before the action, and all the products collected and weighed, the 2 results will be found to be equal. This was known to be true with regard to simple actions where there is no change from gas to liquid or solid, or vice versa, and other experimental evidence caused the principle of the 'Conservation of Matter' to be extended to all cases. The value of this principle has been enormous, particularly in the direction of detecting new elements, and it was soon seen that the combined weights of the elements in the substances decomposed remained constant although the elements became otherwise combined.

John Dalton believed, with Newton, that gases consisted of particles, or 'corpuscles.' He appears to have reasoned that, as all the particles of the same substances are alike, any chemical action between 2 substances means a similar change in the individual particles of the substances concerned. The particles, therefore, must be chemically divisible, the particles of a compound into 'As.' of the elements combined. Dalton enunciated the law of *constant proportions*, which states that when 2 elements unite to form a compound the weights that combine are in an invariable ratio, a ratio that is characteristic of that compound. When, for instance, oxygen and hydrogen combine to form water, as all oxygen As. are of the same weight, and the weight of hydrogen As. likewise constant, and as each molecule of the resulting water contains the same proportion of hydrogen and oxygen As., it follows that the weights of the quantities concerned will be proportional to the weights of the As. Dalton considered that a molecule of water consisted of 1 A. of hydrogen and 1 of oxygen. As it was necessary to have 8 times as much oxygen by weight as hydrogen to produce water, it was calculated that the weight of an A. of oxygen was 8 times that of an A. of hydrogen. Other reactions, however, modified this view. For example, marsh gas consists of carbon and hydrogen. From the constitution of carbon monoxide ( $\text{CO}$ ) it was found that a weight of 6 units of carbon combined with 8 units of oxygen. On the assumption that the atomic weight of oxygen was 8, hydrogen as the lightest gas being 1, the atomic weight of carbon must be 6. In forming marsh gas 6 units of carbon combine with 2 units of hydrogen. This gives  $\text{CH}_4$  as the formula for marsh gas. It was found, however, that a quarter of the hydrogen could be replaced by half an equivalent of chlorine, giving  $\text{CH}_3\text{Cl}$ , which is absurd. This must therefore be read as  $\text{C}_2\text{H}_5\text{Cl}$ , which means that the formula for marsh gas must be revised to read  $\text{C}_2\text{H}_4$ . But if the atomic weight of carbon is 6 it always appears in organic reactions in even numbers; therefore the probability is that

the atomic weight is 12. This necessitates again revising the marsh gas formula, which now reads  $\text{CH}_4$ . Therefore, from the formula  $\text{CO}$ , the atomic weight of oxygen is 16. Besides, if oxygen were 8, other formulæ would appear with O as an even number. Therefore, formula for water =  $\text{H}_2\text{O}$ .

The above is an example of the reasoning by which the relative proportions of the As. in molecules were arrived at, and each result helped to confirm or revise previous determinations. It was known that the same elements combined in different proportions to form different substances; carbon, for instance, forms 2 oxides  $\text{CO}$  and  $\text{CO}_2$ . The relations between such substances is expressed by the law of *multiple proportions*, which asserts that if 2 elements form more than 1 compound, then the weights of the 1 element which are found combined with unit weight of the other in the different compounds must be in the ratio of 2 or more whole numbers.

Shortly after Dalton's A. T. had been enunciated, Gay-Lussac investigated the volumetric conditions of gases in combination, with the result that he discovered and pub. the law that when gases combine together they do so in vols. which bear a simple ratio to one another and to that of their product. In 1811 Avogadro pub. his hypothesis on the molecular constitution of gases, which asserts that under the same conditions of temp. and pressure equal vols. of all gases contain the same number of molecules whether those molecules consist of single As. or are composed of 2 or more As. of the same or different kinds. Both hypotheses were well supported by experimental evidence, and form in combination an interesting corollary to Dalton's A. T. It was found that 2 vols. of hydrogen united with 1 vol. of oxygen at the same temp. and pressure to form 2 vols. of water vapour under the same conditions of temp. and pressure. From Avogadro's hypothesis it follows that there must be the same number of molecules of water vapour as there were of hydrogen. Therefore each molecule of water contains just as many As. of hydrogen as a molecule of hydrogen. As the formula for water is  $\text{H}_2\text{O}$ , it follows that a molecule of hydrogen contains 2 As. If the molecular weight of hydrogen be taken as 2, the molecular weight of any vapour can be obtained by comparing the weight of an equal vol. of hydrogen at the same conditions of temp. and pressure. If the molecular weight of all compounds of oxygen be found in this way, and if each compound is decomposed and the weight of oxygen determined with relation to the rest of the constituents, the weight of the As. of oxygen in the molecules of its compounds can be calculated. These will bear a simple relation to each other, and the least is taken as the atomic weight, for it is assumed for this purpose that an element enters into at least one compound as a single A.

In this and other ways the atomic weights of all the elements have been



determined and tabulated. At first it appeared as if they would all bear a simple relation to one another, but this proved to be illusory, and many of the early atomic weights which were relied upon on account of their simplicity have been superseded by more accurate determinations. The whole mechanism of formulæ and equations is based on atomic weights, so that the progress of chem. may be said to be determined largely by the A. T. In considering organic compounds we find no such simple procedure as in inorganic substances; some of the molecules, such as that of sucrose,  $C_{12}H_{22}O_{11}$ , contain a surprising number of As., and the molecules are credited with a certain structure in which the various As. have peculiar tendencies and affinities. On the whole, however, it may be said that the A. T. provides a good foundation for the theory of organic chem., and a number of interesting syntheses have been made possible through its instrumentality.

*Atomic Structure and Atomic Energy.* Until near the close of the nineteenth century it was possible to regard the As. of the various known elements as completely stable particles, and although As. of different elements have different properties and must therefore have diverse internal structures, little or nothing was known of these. It was found, however, that certain of the heavier As., such as those of uranium, thorium, and radium, emit continuously certain types of radiation which came to be known as alpha, beta, and gamma rays. Rutherford and Soddy were able to show in 1902 that such radioactive As. are unstable and break up spontaneously to form As. of a different kind, and the alpha rays themselves are found to consist merely of charged helium As. travelling at very high speeds. By studying the collision of alpha particles with other As. Rutherford, in 1911, showed that practically the whole mass of any A. is concentrated in an extremely small central nucleus bearing a charge of positive electricity, the magnitude of the charge being characteristic of the element to which the A. belongs. Around the nucleus, and at relatively great distances from it, revolve a group or groups of electrons, or charges of negative electricity, in number sufficient to counterbalance the positive nuclear charge and render the A. as a whole neutral. These ideas of structure were further developed by Bohr, Sommerfeld, and others, and have proved extremely fruitful in explaining the properties of different As., and hence of matter in bulk.

Since the electrons surrounding a nucleus shield the latter from the action of other As. the chemical and physical properties of an element are determined, in the main, by the number and grouping of the electrons, and the similarity in this respect of As. of the same element explains why they behave in the same way in chemical reactions. Many elements, however, are found to be made up of As. which differ from one another in that, while they possess equal nuclear charges,

they have nuclei of differing masses. Such similar As. are called isotopes. In hydrogen 2 isotopes are found whose masses are in the ratio of 2 to 1, and these differ somewhat in their physical and chemical properties. In general, however, the percentage differences of mass of the isotopes of an element are small and it is practically impossible to separate them by taking advantage of the very slight differences of their chemical behaviour. Very minute quantities of isotopes may be separated readily from a mixture of them by allowing the As. to pass, while electrically charged, through suitably arranged electric and magnetic fields, and considerable progress has been made in increasing the amounts so obtainable. Another method of separation makes use of the fact that, in a gas, the speed at which As. wander from point to point depends upon their masses.

The alpha particles from radioactive As. are emitted at very high speeds, and Rutherford showed that if they collide directly with the nuclei of other As. which are normally stable ones, these can themselves be transformed into As. of a different element. During its passage through matter, however, an alpha particle loses speed through interactions with electron groups surrounding nuclei, and as the nuclei themselves are extremely minute the usual fate of an alpha particle is for its speed to be reduced in this way to a low value before a direct collision occurs. As a result, the transmutation of an A. to one of a different type by an alpha particle collision is a very rare event. Atomic transmutation on a larger scale was produced in 1932 by Cockcroft and Walton when they bombarded lithium As. with high-speed hydrogen nuclei and obtained helium, but the amounts of the product were still extremely small.

The natural and artificial disintegrations of atomic nuclei are not only of interest from the point of view of transmutation, but also because of the enormous amounts of energy involved. The source of the high speed of alpha particles is found in the destruction of a small fraction of the mass of the A. that disintegrates. As a deduction from his theory of relativity Einstein showed in 1905 that there is no essential difference between mass and energy, and that the destruction of mass would result in the production of large quantities of energy. Since the complete destruction of 1 oz. of matter would release an amount of energy comparable with that obtained by the combustion of 100,000 tons of coal, even the small mass destruction which accompanies certain nuclear transmutations may be of immense practical importance. Until recent years, however, the release of energy in considerable amounts had not been achieved, owing to the difficulty of bombarding nuclei by particles which could, except in rare instances, penetrate within them. Alpha particles, as well as the nuclei used in such experiments as those of Cockcroft and Walton, are positively charged and so are repelled by the positive charges of other

nuclei, with the consequence that only a very small fraction of the bombarding particles approach sufficiently closely to cause nuclear changes. A much more potent bombardment would obviously occur if the bombarding particles carried no charge. In 1932 such neutral particles, called neutrons, were shown by Chadwick to result from the bombardment of beryllium by alpha particles, and streams of neutrons produced in this and other ways were soon shown to be very efficient agents for producing nuclear changes.

The methods of obtaining streams of neutrons involve the expenditure of considerable amounts of energy, and since many neutrons are necessarily slowed down and lost by absorption in atomic nuclei, the bombardment of most substances does not result in the production of a useful balance of energy. It is found, however, that if the rare isotope of uranium known as U235 is subjected to bombardment by neutrons of a suitable speed the uranium nuclei disintegrate into 2 fragments of approximately equal masses with the simultaneous production of further neutrons and release of large amounts of energy. Since the neutrons so produced are themselves capable of causing the disruption of other uranium nuclei, the process can, in a mass of U235 of suitable size, rapidly develop and release enormous amounts of energy, as in atomic bombs. The size is of importance since the neutrons produced in a small mass of U235 can escape from it without colliding with nuclei, and so without producing other neutrons. By the admixture with U235 of other As. capable of retarding and capturing neutrons the rate of release of energy can be slowed down and controlled, to be used for industrial purposes. The more abundant isotope of uranium, U238, if bombarded with neutrons of a suitable speed, is transformed into plutonium, an element which is not found in nature. This element, like U235, has potentialities as a source of atomic energy. Apart from the immense technical difficulties of using U235 as a source of industrial power, the separation of this isotope from U238 is both expensive and difficult. The extent to which atomic energy will be used in the near future to replace other sources is therefore a matter for speculation.

For the hist. of the A. T. see H. E. Roscoe and A. Harden, *New View of the Origin of Dalton's Atomic Theory*, 1896. For modern conceptions, see E. da C. Andrade, *The Structure of the Atom*, 1923; and *The Atom and its Energy*, 1947, or any modern textbook of general chem., e.g. F. A. Philbrick and E. J. Holmyard, *A Text-book of Theoretical and Inorganic Chemistry*, 1932.

**Atomic Bomb.** Scientific research dating from the close of the nineteenth century showed that particular types of atoms are unstable and disintegrate spontaneously to form atoms of other types, with the simultaneous release of large quantities of energy. In the period 1934-39 a new type of A. disintegration was found to occur when certain

atoms—in particular those of uranium—were bombarded by neutrons (see ATOM AND ATOMIC THEORY). These A. changes are known as nuclear fission. They differ from ordinary radioactive ones not only in the production of much larger amounts of energy, but also because they may, under certain circumstances, be self-propagating. During nuclear fission other neutrons are set free, and these, by collision with atomic nuclei, generate further supplies of energy, and still more neutrons. The result of this chain reaction is that, if the mass of material is of sufficient size for more than a certain fraction of the secondary neutrons to undergo nuclear collisions before they escape into the surrounding space, an enormous amount of energy is released in a very short time, and the material acts as an immensely powerful explosive. Since sufficient neutrons are always present to initiate the chain reaction, any mass of the material greater than a certain critical one is self-detonating, whereas smaller masses, from which neutrons can escape without nuclear collision, are not explosive.

A committee was set up in Great Britain in 1940 to investigate the possible use of A. fission in a bomb, and similar work was undertaken about the same time in the U.S.A. It soon became apparent that such a weapon was a possibility, and after the U.S.A. entered the war the scientists of the 2 countries collaborated closely in its development. Owing to the greater facilities available in America the large-scale work of production was undertaken there. Among the problems to be solved were: (a) The isolation in considerable quantities of the rare isotope of uranium, U235, which is present in ordinary uranium to the extent of 0.7 per cent only. The commoner isotope, U238, is unsuitable. (b) The measurement of the distances neutrons travel in U235 without collision with nuclei, and of the number and speeds of neutrons set free during fission. These factors determine the critical mass, above which the bomb will be explosive. (c) The design of the bomb itself. Owing to the peculiarities of U235 as an explosive, the bomb must be carried to its destination in parts the union of which causes it to explode. If, however, the parts are brought together slowly they will be driven apart again as the reaction is initiated, and it will cease before it has proceeded far. To permit more than a negligible fraction of the available energy to be released the 2 parts of the bomb must collide at a speed comparable to that of a high velocity shell from a gun.

The solution of such problems and the production of sufficient quantities of the atomic explosive had been achieved in 1945, and 2 A. Bs. were dropped on the Jap. cities of Hiroshima and Nagasaki. The enormous devastation caused, and the knowledge that they were powerless to prevent further attacks of a similar nature, were important factors in influencing Jap. leaders to sue for peace, and Japan surrendered shortly afterwards.

**Atomic Heat**, the capacity for heat possessed by the atoms of different elements. Dulong and Petit, by a careful determination of the specific heat of 13 of the solid elements in 1819, showed the chemical equivalent and the specific heat of these substances. They therefore concluded that the specific heat of the substances varies inversely as the A. weight, and proposed to adopt as the A. weights those numbers which, multiplied by the specific heat, gave a constant product. Within certain limits of temp. the theory is true for the greater number of elements in the solid state. Thus if we take a number of grammes of an element equal numerically to the A. weight, as, for instance 35.5 grammes of chlorine, 12 grammes of carbon, we find that they require approximately the same amount of heat to raise their temp. 1 C. degree. The theory has been useful in determining the A. weight in doubtful cases.

**Atomy**, properly plural of Lat. *atomus* (*atomi*), was used as a singular noun meaning a mote, a speck. It was also used to denote a diminutive, insignificant being, a pigmy (Shakespeare's *Romeo and Juliet*, I. iv. 57, 'Drawn with a team of little atomies'). Also used by Shakespeare and other authors as a term for a skeleton (abbreviation of anatomy).

**Atonality**, a style of musical composing without conscious reference to any scale or tonic. The desire to elude a fixed tonality (key) is as old as Mozart, but the term was first given to the work of Arnold Schönberg (q.v.). The sources may be traced through the chromatic harmony of Wagner's *Tristan*. A. also came about through building up dissonances on every degree of the chromatic scale, so that each degree gains the function of a dominant. Schönberg uses A. in a contrapuntal way, often polytonally. Amongst the purely atonal writers are Bartók (q.v.), Honegger (q.v.), Bliss, Stravinsky (q.v.), and Sorabji. Debussy achieves atonal effects often through the use of the whole-tone scale. Richard Strauss and Granville Bantock resorted occasionally to A. before 1911. See Dent's *Dictionary of Modern Music and Musicians* (ed. A. E. Hull), 1924.

**Atonement**, a theological term denoting the doctrine of the necessity for a means of some form of satisfaction or reparation for sin, leading to reconciliation between God and man. Such a theory presupposes that the natural relation of God towards man is favourable, that it has been disturbed by man's sin, and that a restoration of the previous relations is possible. The means of this restoration, i.e. the problem of the A., is one of the greatest and most difficult questions of theology.

The term is common in the O.T., but its teaching on the subject is very varied and disconnected. Its general trend, however, through the rites of sacrificial law, is towards vicarious A., though the ideas of punishment, repentance, and amendment are frequently included, and this sacrificial theory is connected with

Christ by the writers of the N.T. Here the word atonement is used only once, such terms as reconciliation, propitiation and salvation taking its place with various meanings. The teaching of St. Paul is directly in the line of the Jewish doctrine of vicarious suffering, the death of Christ being held to satisfy the outraged divine righteousness. St. John looks upon Christ more in the light of a propitiation for man's sin, provided by the love of God, and as man's advocate with God, while the writer of Hebrews teaches that Christ's death is the transcendent completion of the ritual of the law.

Later Christian interpretations of the A., while in the main following St. Paul's substitutionary doctrine, have assumed many different forms. The early fathers paid more attention to the Incarnation, but seem to have held that the death of Christ was a ransom paid to the devil for the sinful souls of whom he was lawful owner. The subject was raised into prime importance by Anselm's treatise *Cur Deus Homo*, which regarded the A. as necessary to satisfy the honour of God, and the offering of Christ as of sufficient value to outweigh man's sins. This is sometimes referred to as the commercial theory. In Anselm's belief A. was necessary, but this was controverted by Abelard, who held that God could have forgiven sin without requiring equivalent satisfaction. St. Bernard held to the old idea of the A. as a ransom from the devil, necessary for man's redemption, an opinion adopted by Aquinas, admitting, however, only a conditional necessity for the A. by Christ's death. The chief teaching at the Reformation was on the substitutionary basis, holding that, to satisfy the divine justice, Christ bore a punishment equivalent to that deserved by man. Later theories were that of Socinus, teaching that the Crucifixion was an assurance of God's love and an example of obedience, and the governmental theory of Grotius, to the effect that the A. took place to further the divine gov. of the world by exhibiting God's hatred of moral evil.

The present tendency of thought on the subject is to modify the old objective explanations of the A. either on substitutionary or governmental grounds in the direction of the subjective theories, taking up the attitude of the moral effect of the Passion on man. F. D. Maurice and McLeod Campbell hold to the view that Christ completely identified Himself with man, and in His death offered up an equivalent repentance. Kitzschl believes that the main idea of the A. is not propitiation, but reconciliation. Dr. Dale's *Atonement* teaches that the need for Christ's sacrifice lies in an ideal law of righteousness, not in the personal demands of God. In all probability the view of Bishop Butler, that no theory of the A. is competent, is nearest to the truth.

Sir Oliver Lodge, in his suggestions towards a re-interpretation or modification of the Christian doctrine of A., considers that the doctrine represents a

survival of religious beliefs held some 6 centuries before the Christian era, and cites Euripides' account of the sacramental tasting of blood by the Orphic congregations. He denies the existence of any 'original' or 'birth' sin, and thinks that the consequence of such a belief leads to the denial of the hope of a higher humanity, merely in order that man's sins may be superhumanly atoned for. He takes up the position that man is beginning to realise a further stage in the process of A. and rising to the conviction that we are a part of Nature and of God, and that the union with Divinity and not anything legal or commercial is what science itself will some day tell us is the inner meaning of the redemption of man.

See J. M. Campbell, *Nature of the Atonement*, 1871; R. W. Dale, *Atonement*, 1875; H. N. Oxenham, *The Catholic Doctrine of the Atonement* (3rd ed.), 1881; A. Ritschl, *The Christian Doctrine of Justification and Reconciliation*, trans. 1900; J. Denny, *Death of Christ*, 1903; G. B. Stevens, *Christian Doctrine of Salvation*, 1905; Sir Oliver Lodge, *Man and the Universe*, 1911; L. W. Grensted, *A Short History of the Doctrine of Atonement*, 1920; J. K. Mozley, *The Heart of the Gospel*, 1925; R. S. Franks, *The Atonement*, 1934.

**Atooi** is the name of one of the larger Sandwich Is., in the N. Pacific Ocean. Hills rise from the sea, and at a little distance back are well wooded, whilst the central peaks attain a height of 7000 ft. The is. has a length of nearly 40 m., and is situated in long. 158° 40' W., lat. 21° 59' N. The chief ports are Warnea and Hanalei.

**Atossa**, Queen of Persia, daughter of Cyrus, and wife successively of Cambyses, Smerdis the usurper, and Darius Hystaspis, to whom she bore Xerxes and 3 other sons, and whom she influenced to invade Greece. She is mentioned by Herodotus and is a prominent character in the *Persæ* of Æschylus.

**Atrato**, a riv. of S. America in W. Colombia, rising in the W. Cordilleras, at an elevation of over 10,000 ft. It flows almost due N. for 400 m. into the gulf of Darien, forming a large delta at its mouth, though none of this is navigable. The riv. is navigable for about half its length, and at one time received much attention as a possible basis for a canal across the Isthmus. Gold is found around its tribes.

**Atrebates**, an anct. people of Belgic Gaul, whose cap. was Nemetacum. They formed a confederacy with the Nervii against Julius Cæsar, by whom they were utterly defeated at Axona. A branch of them settled in Britain, where is now the co. of Berkshire. From their name came the modern Artols (prov. of France) and Arras.

**Atrék**, or **Attrék**, a riv. in the N. of Persia, flows partly along the frontier, then into the S.E. corner of the Caspian Sea. It is 250 m. in length, and almost dry at the mouth during the summer.

**Atrous**, in Gk. legend, the son of Pelops and Hippodamia, and brother of

Thyestes. The fate of the house of Pelops, which afforded materials to the tragic poets of Greece, runs thus. As a result of their murder of their step-brother Chrysippus, A., and Thyestes were forced to flee to Mycenæ, where A. became king. Thyestes seduced Aërope, his brother's wife, and was driven from the country. To avenge himself he sent Pleisthenes, a son of A. by his first wife, to kill his father, but A. slew him without recognising him. It was now the turn of A. to plan vengeance. He pretended reconciliation with Thyestes, and having slain his 2 sons, served them up at a banquet. Thyestes fled in horror. Later A., ignorant of her family, married Pelopia, the daughter of Thyestes, and adopted Ægisthus, her son by Thyestes. Agamemnon and Menelaus, the sons of A. by Aërope, find Thyestes and take him to their father. Thyestes is imprisoned and A. sends Ægisthus to kill him. But Thyestes recognises his son by the sword with which the latter intended to slay him, and having made his own identity known to Ægisthus, the father and son decide to kill A. They do this, and seize the throne. It is noteworthy that though this is reputed the most horrible legend in Gk. mythology, no mention of it whatever is made in Homer. The legend figures in 2 plays of Sophocles and 1 of Euripides, all of which are lost.

**Atri**, a tn. of Italy, in the prov. of Teramo. Its fine Gothic cathedral contains interesting frescoes and paintings. Pop. 13,200.

**Atrium**, the prin. room of the anct. Rom. house. It contained the nuptial couch, the hearth, and the family gods. Though in early times it was used as the common living-room, in more sumptuous times it came to be reserved as a room for the reception of clients and guests. There were many varieties of atria. The word was also applied to public halls and buildings, such as the A. Vestæ, and was later given to the porch or court before a temple or basilican church.

**Atropa**, a genus of Solanaceæ, containing many poisonous species. *A. belladonna*, deadly nightshade, grows in thickets and hedges of Britain, and has a purple bell-shaped flower. It contains *atropine*, from which belladonna is made; the drug is used in medicine in cases of nervous diseases, and when injected into the eye causes a dilatation of the pupil. The berries are poisonous, as are the roots and leaves. *A. mandragora*, the mandrake, found in S. Europe, is an even more dangerous species.

**Atropatene**, see AZERBAIJAN.

**Atrophy**, the diminution in the size of a tissue or organ, the result of degeneration of the cells or a decrease in the size of the cells. The immediate cause of degeneration is the cessation or diminution of the supply of nutriment to the part. The opposite condition is *hypertrophy*, when increased nutrition causes an enlargement of the tissues. A. may be due to loss of functional activity when such activity has become unnecessary, as

in some embryonic appendages, the shrivelling of the ovaries after the child-bearing period, etc. It thus plays an important part in the process of evolution, procuring that a part which is no longer used gradually passes out of existence. A. occurs when the normal supply is obstructed by accident, disease, or deliberate constriction. The shrinking of the feet in Chinese women is an example of the latter, and probably certain forms of A. of the liver may be traced to the practice of tight-lacing. Yellow A. of the liver is an acute disease of doubtful etiology. It is characterised by increasing jaundice, vomiting, the presence of a large amount of bile, with leucine and tyrosine in the urine, and is almost invariably fatal.

**Atropine** ( $C_{17}H_{23}NO_3$ ), an alkaloid obtained from *belladonna* leaves or root. It is used in medicine as a sedative and local anodyne. In large doses the drug is a powerful poison, producing hallucinations, delirium, and a marked stimulation of the heart, which ultimately becomes paralysed. When dropped into the eye, A. causes marked dilatation of the pupil and at once relieves pain in that organ. It is used externally to relieve neuralgia, and in small doses as an antidote to opium poisoning.

**Atropos**, the unalterable (Gk. *ἀ*, privative and *τροπή*, to turn), the eldest of the Fates, whose duty it was to cut the thread of human life, which had been measured by Clotho and drawn out by Lachesis. She is generally represented with a cutting instrument, scales, or a sun-dial.

**Attaché** (Fr., attached), a subordinate attached to the suite or company of a commanding officer. In practice, the term is restricted to military or naval As., who are young diplomatic officers, attached to an embassy or a legation, or travelling with an ambas. to a foreign country. It is their duty to make themselves familiar in an honest fashion with the naval and military condition of the country they are in, and to report on all matters likely to be of interest and value to the home gov. In time of war there are various As. at the headquarters of each army. This post is then generally conceded to the envoys of those foreign powers who need representatives at the seat of war.

**Attachment**, a legal process by which a defendant may be brought before a court by the taking of his person or his goods. The writ is issued to the sheriff. It is a process properly applicable to the offence of contempt of court, and therefore is not necessary where the offence has been committed in open court, for the offender is then present, and can be dealt with without the necessity for A. It differs from arrest in that it can be effected on a man's goods as well as his body, and also that the person attached is kept till the day appointed and not brought before a court at once. It differs from distress in that it is not applicable to lands, but only to goods. County courts can only punish for contempt in presence of the

court, and therefore cannot issue writs of A.

**A. of Debts.**—By the Common Law Procedure Act, 1854, and Judicature Act, 1873, a creditor, after obtaining judgment against a debtor, and after affidavit that the debt is not paid and that debts are owed to the debtor by a third party, may attach all such debts and issue execution if the third party does not dispute the debt. Wages of a servant, labourer, or workman (Wages Attachment Abolition Act, 1870), and of a seaman or apprentice (Merchant Shipping Act, 1894), are not open to A.

**Foreign A.**—A legal process peculiar to the Mayor's Court in London and also in Bristol, Exeter and Lancaster, by which a creditor may, before judgment, attach money owed to the debtor or property belonging to him in the hands of third parties. See also GARNISHEE.

**Attainder** (Norman-Fr. *ataindre*, Lat. *attingere*, to reach, to touch upon). The erroneous derivation of the word from the Lat. *tingere*, to dye, to taint, had far-reaching consequences on the Eng. common law, giving rise, as it did, to the doctrine of corruption of blood. A. is the consequence which follows from the passing of sentence of death upon a criminal, or of outlawry in cap. felonies, outlawry in these cases being equivalent to a sentence of death. By the sentence the prisoner became *attaind*, that is to say, he lost all power over his property, and was incapable of performing any of the duties, or enjoying any of the privileges, of a freeman. The blood of the prisoner was said to be corrupt or tainted, neither land nor titles descending to his heirs. By an Act of 1870 A. was abolished in the United Kingdom. In Eng. hist. there have been frequent instances of As. by express legislative enactment, called Bills of A. These enactments provided for the attaind and punishment of persons held to be guilty of offence against the peace and security of the State, and were known as Bills of A., or Bills of Pains and Penalties. The effect of such a Bill is to supersede the ordinary process of law, and although the imprisonment and execution of persons by this means are entirely legal (as coming from the source of law, Parliament), yet in both its employment and its administration it is quite arbitrary. Persons were attaind upon mere hearsay evidence, and some upon no evidence at all, without being heard in their defence. The practice of introducing Bills of A. into Parliament arose in the reign of Richard III., somewhere about 1477, and by the end of the reign of Henry VIII. scarcely a year passed without persons of the highest rank being brought to the scaffold by this means. Under the Stuarts recourse was seldom had to this proceeding, but it was adopted by the Long Parliament against Lord Strafford. His A. was reversed after the restoration of Charles II., and all records of the proceedings cancelled by Act of Parliament. On the other hand, in the same reign the 4 regicides—Cromwell, Bradshaw, Ireton, and Pride—were

attainted, although deceased. The last execution to take place by means of an Act of A. was in 1797, and the most recent instance of a Bill of Pains and Penalties is that directed against Queen Caroline, the wife of George IV., in 1820.

**Attaint**, a writ, which formerly lay to inquire whether a jury had given a false verdict. It was first introduced by Henry II. at, it is said, the instance of Chief Justice Glanville. At first it only lay on the trial of writs of assize, but it was extended gradually, and by the reign of Edward III. it applied to all pleas whatsoever, whether real or personal, except writs of right, where the issue was joined on the *mere right*. If the jury on the A., who were 24 in number, found that the verdict was false, the judgment against the jury who found the false verdict was very severe. But more moderate judgment was introduced in the reigns of Henry VII. and Elizabeth. So ineffectual, however, was this proceeding, that in the time of James I. it gave place to the now-existing practice of setting aside verdicts on motion and granting new trials. By 6 Geo. IV. c. 50, which consolidated the laws relating to juries, proceedings by way of a writ of A. were abolished.

**Attalea**, a genus of S. Amér. palms (order Palmæ). *A. funifera*, called *piacaba* by the natives, yields a very strong fibre used in rope-making.

**Attalia** or **Attaleia**, an anct. seaport on the coast of Pamphylia, near the mouth of the R. Catarrhactes, and about 15 m. distant from Perga. It was built by Attalus II. (159-138 B.C.), and subdued by the Romans under P. Severus Iulianus. It is now named Adalia (q.v.). The place was visited by Paul on his first missionary journey (Acts xiv. 25).

**Attalus**, name borne by 3 kings of Pergamus: 1. Surnamed Soter, reigned 241-197 B.C., became an ally of Rome in that city's struggle against Philip of Macedon and the Achæans. He was wealthy, just, and wise, and a liberal patron of literature. 2. Surnamed Philadelphus, reigned 159-138 B.C., succeeded his brother Eumenes. Like his father, he was an ally of Rome and a great patron of the arts. 3. Surnamed Philometer, reigned 138-133 B.C.; by his will left Pergamus to the Rom. people. There are conflicting accounts of his life.

**Attalus**, a senator of Rome, in the reign of Honorius, was sent by the Romans to that emperor at Ravenna to represent to him the difficult situation of the cap., threatened at that time by Alaric and to advise him to fulfil the conditions of a treaty which he had concluded with that Gothic chief; but Honorius refused, and Alaric, being joined by his brother-in-law, Ataulphus, laid siege to Rome. A., who was then prefect of Rome, was proclaimed emperor by Alaric, who required the Romans to swear allegiance to him A.E. 409. A. then went with an army of Romans and Goths to besiege Honorius in Ravenna, who proposed to associate him in the empire, but A. refused to listen to the proposals, thinking him-

self possessed already of the real power. A., however, having opposed Alaric in some of his views, was immediately deposed by the Gothic chief. After this, Alaric again besieged Rome, took it, and gave it up to pillage in Aug. 410. Upon Alaric's death, A. followed the fortunes of his successor, Ataulphus, whom he accompanied into Gaul. After the death of Ataulphus, his successor, Vallia, having concluded peace with Honorius, A. endeavoured to escape the emperor's vengeance, but was taken, and, by order of Honorius, confined in the is. of Lipari, after having had the fingers of his right hand cut off, in order to prevent him from being able to write. A. was afterwards recalled to Rome, where he d. in obscurity. (Zosimus, Orosius, and Gibbon.)

**Attalus**, general under Philip II. of Macedon, and uncle of Cleopatra, whom Philip espoused c. 337 B.C. At the wedding, he offended Alexander, son of Olympias, whom Philip had repudiated, by expressing a wish for a legitimate successor to the throne. After the death of Philip, he opposed Alexander, but his soldiers deserted him and he was slain.

**Attar of Roses**, the essence or oil of the *Rosa centifolia*, or *Rosa damascena*, produced from these flowers by distillation in water, the oil being then collected from the surface of the water by means of a feather. It is chiefly prepared in Persia, India, and Turkey, from which countries it is exported in small vials. The perfume is very costly, and is in itself too strong to be at all pleasant. It is freely used as an ingredient in other perfumes, a few drops of it scenting a great quantity. It is also known as Otto of Roses.

**Attempt**, a technical term in criminal law applied to an act done with the intent to commit a crime. In England any act which if uninterrupted and successful would have been a crime, is regarded as an A., even if the accused of his own free will decides not to carry out his original intent. An attempted murder, however, is termed felony.

**Attention**. In psychology two kinds of attention are recognised: (1) The passive, being the concentration of the consciousness upon a definite object or objects by isolating the perception from other objects. As all consciousness depends upon a certain degree of isolation, such passive attention may ultimately be regarded as the necessary condition of consciousness. (2) The active, being the voluntary act of fixing the mind upon a definite object or objects. The force of this act of volition varies with the individual, and is capable of development.

**Atterbom**, Per Daniel Amadeus (1790-1855), the great poet of the Romantic movement in Sweden, was b. in E. Gothland. He studied at the univ. of Upsala, where he founded the Aurora League, a society for the reform of Swedish literature. The best known of his works are *The Isle of Blessedness*, a romantic drama, and the series of lyrics entitled *The Flowers*, which introduced

the sonnet to Sweden. He also left an unfinished fairy drama, *The Blue Bird*. His works are marred by a tendency to introduce philosophic and religious meditations and allegory. In 1835 he was made prof. of aesthetics and literature at Upsala. His *Swedish Seers and Poets* is an interesting series of biographies.

**Atterbury, Francis, Bishop of Rochester** (1662-1732), distinguished as an Eng. man of letters, a bishop, and a politician, was b. at Middleton Keynes in Buckinghamshire. He was educated at Westminster School, from which he proceeded to Christ Church, Oxford. As a Protestant, he answered an attack made on the spirit of the Reformation which aroused the indignation of the Papists by the vigour of its rhetoric. He took holy orders in 1687, and readily swore allegiance to William III. after the Revolution. He won great fame as a preacher, and became in 1691 lecturer of St. Bride's, chaplain to William and Mary, and minister to Bridewell Hospital. In 1698 appeared the Hon. Charles Boyle's attack on Bentley's *Dissertation on the Epistles of Phalaris*, an attack which was mainly from the pen of A., who was Boyle's tutor. He distinguished himself also by his defence of ecclesiasticism against the attacks of the civil law. In 1701 he became an archdeacon, a prebendary of Exeter Cathedral, and a D.D. In 1704 he became dean of Carlisle, in 1709 preacher at Rolls Chapel, in 1712 dean of Christ Church, in 1713 bishop of Rochester and dean of Westminster. He was probably instrumental in the drawing up of Sacheverell's defence. He took part in the coronation of George I., but his influence was destroyed, since his leanings towards Jacobitism were known. In 1717 he held direct communication with the Pretender. In 1721 he was arrested for participation in a plot to proclaim King James, and in 1722 imprisoned in the Tower. In 1723 he was deprived of his titles and banished. He entered the service of the old Pretender and d. in France in 1732. He was buried secretly in Westminster Abbey. He numbered amongst his friends and correspondents all the great literary men of the period.

**Attestation.** Most important legal documents, especially wills and deeds (*q.v.*), require to have the signature of the person making the instrument attested by one or more witnesses or 'attestors.' All deeds are required by Scots law to have 2 witnesses, unless there is special statutory exemption, and in England wills and grants of land to charities must have 2 attestors. In Scotland no deed is valid if written by another than the party making the deed unless the testing clause (*q.v.*) is regular. The A. of 2 justices is necessary to the indenturing of pauper apprentices to the sea. One witness is necessary to a bill of sale, and to witness a warrant of attorney or a cognovit (*i.e.* an admission by a defendant of the justice of the whole or part of a plaintiff's claim) the signature of a solicitor is obligatory.

**Atthis**, a genus of small humming-birds found in S.W. U.S.A. and elsewhere.

**Attic**, a term in architecture designating a low storey introduced above the main cornice in the elevation of a building. An *A. base* is a form of base employed in the Ionic order, and sometimes in the Corinthian. It consists of 2 toruses, separated by a scotia (concave moulding in base of a column) resting upon a plain square plinth.

**Attic Dialect**, the language of Athens during the period of her literary greatness, originally a development of the Ionic dialects. It is the basis of ordinary Gk. grammars, the Old Ionic or Homeric, Æolic, and Doric dialect forms being given as variants.

**Attica**, one of the divs. of anct. Greece of which Athens was the cap., bounded on the N. by Boeotia, on the W. by Megaris and the Saronic Gulf, on the S. by the Ægean Sea. It was a fertile and prosperous state, and sent out many colonies. Striking features of the country are the mts. of Hymettus and Laurium, the latter of which contains silver mines.

**Atticism**, an elegant and classic phrase, characterised by brevity and intellect. The Attic dialect was the purest and most literary of the Gk. dialects. *Attic salt* signifies a poignant and delicate wit peculiar to the refined Athenians and foreign to the blunter Romans.

**Atticus, T. Pomponius** (c. 109-32 B.C.), a Rom. knight, b. at Rome. His name was originally Titus Pomponius; on his return to Rome, 65 B.C., he took possession of the estate left him by his uncle and assumed the name of Quintus Cælius Pomponianus. The name A. was given him from his residence in Athens, and his deep acquaintance with the Gk. literature and tongue. Amongst his fellow students may be mentioned C. Marius and M. Cicero. He left Rome on the outbreak of war between Marius and Sulla, and took up residence in Athens. He refused to take sides in the Civil war, and was an intimate friend of the leaders of all parties. He was a believer in the Epicurean philosophy. He was a great friend of Cicero, from whom he received many letters which are still extant, and a number of whose works he read and corrected.

**Atticus Herodes, Tiberius Claudius** (c. A.D. 104-180), a famous Gk. teacher of rhetoric, who was b. at Marathon. His fame as a teacher of rhetoric was equally known at Rome and at Athens. He numbered amongst the more famous of his scholars the future emperor, Marcus Aurelius, and his future colleague, L. Verus. He became a consul in the year 143. He was exceedingly wealthy, and spent a great part of his wealth in beautifying with magnificent buildings the Grecian ins. of Athens and Corinth.

**Attidian Brethren**, a body of 12 priests in Umbria who had wide authority in that region. The Eugeubine Tables are the records of their acts.

**Attila** (the Scourge of God) (c. A.D. 406-53), king of the Huns, succeeded his uncle Rua or Roua with his brother Bleda

in 433. He claimed for himself divine origin and descent, and from the finding of the so-called sword of Mars, claimed the dominion of the earth. Bleda was put to death in 445, and A. was able to proclaim himself king of the Barbarians from the North Sea to the boundaries of China. He ruled over the Vandals, Ostrogoths, and Gepids. In alliance with Genseric he invaded Mœsia and defeated the forces of Theodosius II. He devastated the whole of the E. portion of the empire, and Constantinople only saved itself by means of its impregnable fortifications. The whole of the Balkan Peninsula was at his mercy, and Theodosius was forced to make peace with him practically on his own terms (446). In 450 a Rom. conspiracy against his life was formed, and in the same year he prepared to invade Gaul. He besieged the tn. of Orleans in 451, but an alliance of the Roms. and Visigoths forced him to raise it and defeated him at Châlons, where 200,000 men are said to have perished. Forced back into Hungary, he invaded Italy in the following year, placed after place falling into his hands. He took and completely destroyed Aquileia (q.v.) in 452, after a siege of 3 months. Rome itself was only saved at huge expense—though according to some authorities A. did not attack Rome in consequence of his interview with Pope Leo the Great. In the next year he d., and with the death of A. his empire fell to pieces. See E. A. Thompson, *A History of Attila and the Huns*, 1948.

**Attis**, see **ATYS**.

**Attius**, see **ACCIUS**.

**Attle**, a miner's term for dirt or rubbish left over after the ore is worked. Originally a Cornish term.

**Attleboro**, a tn. of Bristol co., Massachusetts, U.S.A., 32 m. S.W. of Boston. The tn. manufs. jewellery, silver ware, cotton goods, etc. It comprises sev. vils. and contains the A. Home Sanatorium and a good public library. Pop. 22,000.

**Attleborough**, a mkt. tn. in the co. of Norfolk, England, 15 m. S.W. of Norwich by rail. In the fourteenth century it had a college of the Holy Cross, and its anct. par. church contains some interesting remains. Pop. 2,600.

**Attlee, Clement Richard** (b. 1883), Brit. statesman, educated at Haileybury and Univ. College, Oxford. Called to the Bar, 1905. Secretary of Toynbee Hall, 1910. Lecturer on social science, London School of Economics, 1913-23. Served in the First World War, retiring with rank of major, 1919. Mayor of Stepney, 1919-20. M.P. (Labour) Limehouse div. of Stepney, since 1922. Member of India commission, 1927-30; under-secretary for war, 1924. Chancellor of Duchy of Lancaster, 1930-31; postmaster-general, 1931. In the crisis of 1931 he stayed out with Arthur Henderson, J. R. Clynes, and George Lansbury, preferring the political wilderness and his friends to the high places with Ramsay MacDonald and J. H. Thomas, and in the ensuing general election his friends were decimated. Only Lansbury came back and A. became

deputy leader of the Parl. Labour party. Succeeded George Lansbury as leader of the Labour party, 1935. Privy councillor 1935. Leader of the Opposition when the Second World War broke out. Joined Churchill's Gov. in May 1940 as lord privy seal and leader of the House of Commons, secretary of state for dominion affairs, 1942. Prime Minister and First Lord of the Treasury, and minister of defence, July 26, 1945.



Karsh, Ottawa

**CLEMENT ATTLEE**

**Attock**, a tn. and fort of Pakistan, in the Punjab. It is situated on the l. b. of the Indus, 45 m. E.S.E. of Peshawar, and was founded in 1531 by the Emperor Akbar. It is an important strategic position, as here is the chief bridge over the Indus. It has been the route by which almost all the invaders of India by land—Alexander, Tamerlane, etc.—have made their approach.

**Attorney**, 'one substituted' (from *atourné*, *atournatus*, respectively derived from the Fr. *atourner* and the Lat. *atournare*, to substitute), signifies in its widest sense one put in the place or *turn* of another to manage his affairs. For its use in this general sense, see article **POWER OF ATTORNEY**. In the narrower sense A., or more properly attorney-at-law, was the name given prior to the Judicature Acts, 1873-75, to those members of the legal profession who represented litigants in the courts of common law and briefed counsel on their clients' behalf. The equivalent term for those who practised in the chancery or equity courts was solicitor. Since the enactment above referred to, which extended equity to all courts, the title of solicitor is applied to both solicitors and As. Sec., therefore, article **SOLICITOR**. In the



U.S.A. the term A. includes both barristers and solicitors.

**Attorney, Letter or Power of, see POWER OF ATTORNEY.**

**Attorney-General.** The A.-G. is the chief law officer of the Crown and chief legal adviser to the Gov. He is appointed by letters patent, and his office is in many respects similar to those of the lord advocate of Scotland (*q.v.*), though less extensive and more clearly defined. Originally, he was simply the king's A., and stood in the same relationship to the king as any other A. does to his client. The additional term general probably arose from the need of differentiating him from As. appointed to act for the Crown in particular courts, such as the A. for the court of wards, or the 'coroner and A. for the king,' the official name for the master of the Crown office in the King's Bench Div. The origin of the office is obscure, the first mention of the title being in the reign of Edward I. towards the end of the thirteenth century, when the holder of it is called the *attornatus regis*. Gradually the office has become one of great dignity and importance. Till recently the king's serjeant was the chief officer of the Crown in criminal proceedings. A dispute between this officer and the A.-G. as to precedence was settled in 1811 by George IV., then prince regent, declaring by a special warrant that the A.-G. and the solicitor-general should have precedence over all other members of the Eng. Bar. A similar problem as to precedence between the lord advocate of Scotland and the A.-G. arose in 1834, and was decided in favour of the latter. The A.-G., like his confrère the solicitor-general, is always a member of Parliament and a member of the ministry. He is paid £7000 a year, and receives fees for Crown business, but he has not now the right that he formerly enjoyed of engaging in private practice. Till 1912 the A.-G., though a member of the ministry, was not a member of the Cabinet or of the Privy Council, but in that year Sir Rufus Isaacs, M.P. (later Lord Chief Justice) was given a seat in the Cabinet. The duties of the A.-G. are to represent the Crown in criminal prosecutions, particularly in those heinous misdemeanours that tend to disturb or endanger the State, and in civil cases to conduct suits and prosecutions relating to public questions of professional etiquette. The duchies of Cornwall and Lancaster and the co. palatine of Durham each have their A.-G. The A.-G. of the U.S.A. Gov. differs in some respects from his Eng. prototype. The lawyer chosen for this post is always a lawyer of eminence, though not necessarily in the front rank of the Bar, political considerations having, as in England, much to do with determining the President's choice. The A.-G. exercises a general supervision over the Federal judicial departments, and more especially over the district attorneys (*see* DISTRICT ATTORNEY) and those executive court officers called U.S. marshals. Further, he is a fully fledged member of the

President's Cabinet, and is the regular legal adviser of the President, a function of especial importance, in all those difficult questions which arise as to the constitutional limits of the executive power of the President, and the relations of Federal to state authority. In England the A.-G.'s opinions are treated as confidential, but those of the Amer. A.-G. are often pub. officially, not only in justification of any particular line of action taken by the President, but to inform the world of the view which the executive takes of its legal position and duties in any matter of moment. These opinions have a quasi-judicial authority although they are only of 'persuasive' and not 'authoritative' efficacy, inasmuch as the Federal Court can override them. *See* Bryce, *American Commonwealth*, 1888.

**Attraction** (Lat. *attrahio*, from *ad*, to, *trahere*, to draw), a condition of stress such that 2 bodies tend mutually to approach one another, and to resist separation. Various kinds of A. are those exercised in gravitation, capillary A., chemical A., cohesion, magnetic A., and the universal A. which regulates the movements of the planets. The laws of gravitation were first formulated by Newton, and his law for the A. of masses may thus be stated: Any 2 particles of our planetary system, of mass M and M', respectively, separated by a distance U, exercise upon each other an A, which may be denoted as  $f \frac{MM'}{U^2}$ , where  $f$  is a

constant: i.e. gravitation A. follows the law of inverse squares. The forces of gravitation and magnetic A. act when the bodies are distant from one another, whereas in cohesion (which follows the laws of gravitation) and chemical A. the bodies must be in contact.

**Attrak, see ATREK.**

**Attribute**, properly a necessary property or characteristic of a thing, is used in painting, logic, and metaphysics with special meanings.

In painting, an A. is a conventional symbol added to identify the personage represented.

In logic an A. of a thing is any quality or characteristic which belongs essentially to it, which may be specifically predicated of it. It is in this use opposed to accident.

In metaphysics an A. is the necessary quality of a substance, whether material or spiritual. In Spinoza's philosophy, for instance, an A. is that which the mind perceives as constituting the essence of the thing in question. Divine substance, he says, may have an infinite number of As., but human minds can perceive only extension and thought.

**Atwood, Thomas** (1765-1838), organist and composer, was the son of a coal merchant. Was sent by the Prince of Wales to study music in Italy. On his return he became organist of St. Paul's, and composer to the Chapel Royal.

**Atur, Aturis, or Aturus, see ADOR.**

**Atwood, George** (1746-1807), mathematician and physicist, was b. in London.

He was educated at Trinity College, Cambridge, and having graduated with high honours, was elected a member of the Royal Society in 1770. He wrote various papers for *Philosophical Transactions*, and among his other works may be named his *Treatise on the Rectilinear Motion and Rotation of Bodies, with a Description of Original Experiments Relative to the Subject*, 1784, which described the apparatus known as A.'s machine, to demonstrate the laws regulating falling bodies.

**Atwood's Machine**, an apparatus designed to demonstrate the relations of time, space, and velocity in the motion of a falling body. It consists essentially of a wheel over which 2 masses are suspended, weighing respectively, say, 49½ grammes and 50½ grammes. The total mass is therefore 100 grammes, and the force acting upon the machine is due to the excess in weight of one body over the other, that is, 1 gramme. Let this gramme be a piece of wire which can be removed by a ring on one of the supports of the wheel. A pendulum is provided which regulates a timepiece. The heavier weight is supported by a plate which can be dropped as the pendulum ticks. The ring is slid down so that the weight takes exactly 1 sec. to reach it, which can be arranged after some trial by making the click of the wire on the ring and the tick of the pendulum coincide. The weight, relieved of the wire, still travels downwards until it is stopped by a plate arranged as before to catch it at the end of 1 sec. This plate will be found to be about 9·81 centimetres below the ring. That is to say, the weight of 1 gramme, acting for 1 sec., has imparted to the whole mass of 100 grammes a velocity of 9·81 centimetres per sec. This additional velocity is the acceleration due to gravity, which may be measured in dynes by multiplying the mass by the acceleration, thus:  $F = ma = 100 \times 9\cdot81 = 981$  dynes.

**Atys**, the name given by Leach to a genus of long-tailed decapodous crustacea. They have forceps ending in 4 claws; these are cleft as far as the base and thus appear to be composed of 2 fingers, or lashes, which are joined at their origin.

**Atypus**, a genus of spiders having 6 spinneret glands.

**Atys**, or **Atis**, a deity worshipped in Phrygia in connection with Cybele, whose worship gradually spread throughout the Rom. Empire and Asia Minor. The story of A. is told in various conflicting ways, the best-known account being that by the Rom. poet Catullus.

**Atzgersdorf**, a tn. in Lower Austria, 5 m. S.W. of Vienna; pop. 8800.

**Auah**, see OUDH.

**Aubagne**, a tn. in the dept. of Bouches-du-Rhône, S. France, on the Iruveaune. E. of Marseilles. Its chief manufs. are pottery and leather, whilst the wine of the dist. is also renowned. Its hist. has been varied and it has sev. times been sacked. Pop. 14,000.

**Aubaine**, an anct. Fr. right by which

the property belonging to strangers (not naturalised) or to Frenchmen who left their country became on their decease the property of the lord of the dist. or of the king. It was abolished in 1819.

**Aubanel**, Théodore (1829-86), a Fr. author who, in collaboration with Mistral and Roumanille, devoted himself to the work of reviving and carrying on the native Provençal dialect and literature. He kept up, however, his family trade of printing and editing. His best-known poem is *La Mivugrano entreduberto*. One play of his, *Lou pan dou pecat*, was acted in Provençal and in Fr.

**Aube**, dept. of N.E. France, bounded N. by Marne, N.W. by Seine-et-Marne, W. by Yonne, S. by Yonne and Côte-d'Or, and E. by Haute-Marne. It is formed of the S. part of the old prov. of Champagne and part of Burgundy. Its E. part is watered by the A. and its W. by the Seine, to the basin of which the dept. belongs. The climate is moist and mild, and the chief industry is agriculture. The N.E. is chiefly pastoral, but the S.W. is fertile, and here wheat, oats, vegetables, etc., are extensively cultivated. Chalk, potter's clay, building-stone, and limestone are among the minerals, while cotton-spinning and weaving are the chief industries. Prin. exports, timber, cereals, wine. Cap. Troyes. Area 2326 sq. m. Pop. 243,000.

**Aube**, trib. of the Upper Seine, rises in plateau of Langres. Length 150 m.

**Aubenas**, tn. in the dept. of Ardèche, in S.E. France. It is built in a fine situation on the side of a hill. Chief industries, coal and iron mining, paper and silk making. Pop. of com. 8000.

**Auber**, Daniel François Esprit (1782-1871), Fr. composer of operas, was b. at Caen in Normandy. His father, a print-seller, sent him to London to acquire a knowledge of business methods, but the young man was already deeply imbued with a passion for music, to indulge which he returned to Paris in 1804. After producing 4 concertos for the violoncello and 1 for the violin he resorted to the comic opera *Julie*. Intending to study music seriously, he now put himself under the tuition of Cherubini, and after writing a mass, part of which he later utilised in *La Muette de Portici*, he produced a 1-act opera, *Le Séjour militaire*, which failed miserably. This failure led him to write nothing more until he was compelled by the death of his father in 1819 to make music his means of livelihood. After a half-success in *Testaments et Billets-doux*, he scored a brilliant success in 1820 with *La Bergère châteline*. In 1822 he began his association with E. Scribe, the libretto-writer, and the two began a series of popular and successful productions, among which may be named *Le Domino noir*, 1837; *Le Lac des fées*, 1839; *Les Diamants de la couronne*, 1841; *La Fiancée du roi de Garbe*, 1864.

**Aubergine**, a name for the fruit of a species of *Solanum*. Also called the egg-plant from the shape of the fruit.

**Aubervilliers**, a tn. on the St. Denis

Canal in dept. of Seine, N. Franco. Formerly numerous pilgrims came here to honour Notre-Dame-des-Vertus. It has manufs. of chemicals, perfumery, etc. Pop. of com. 56,000.

**Aubignac, François Hédelin, Abbé d'** (1604-76), Fr. author and critic, tutor to the nephew of Richelieu, who conferred on him the abbey of A. His best-known work is a tragedy, *Zénobie*, 1647, written in prose as an exemplification of critical rules, and he later arranged these in his *Pratique du théâtre*. He was the first to throw doubts on the existence of Homer.

**Aubigné, Françoise d',** see MAINTENON, MARQUISE DE.

**Aubigné, Jean Henri Merle d'** (1794-1872), a Swiss historian, b. at Eaux-Vives. He studied here and at Berlin until, in 1818, he became pastor of the Fr. Protestant church at Hamburg. Five years later he removed to Brussels, where he was appointed court preacher. In 1830 he returned to Geneva and became prof. of church hist. in the newly founded theological school there. He visited England on sev. occasions, where he was warmly welcomed, the univ. of Oxford conferring the D.C.L. degree on him. His best-known work is the *Histoire de la Réformation au XVI<sup>e</sup> siècle*, 1835-53.

**Aubigné, Théodore Agrippa d'** (1550-1630), Fr. soldier and scholar, b. at Pons in Saintonge. He early showed a remarkable talent for languages, especially for the classics, but his attachment to the Huguenot cause made him spend the early part of his life in the military profession. He rendered good service to Henry of Navarre, whom he later criticised with freedom and candour. After Henry's assassination he retired to Geneva and resumed his literary studies. His best-known work is his *Histoire universelle, 1550-1601* (1616-19), which for its indulgence in satire was officially burnt in France. His satiric bent is also shown in most of his other works, e.g. *Confession catholique du sieur de Sancy*. His poems, *Les Tragiques*, are highly praised by Lanson.

**Aubin, a tn.** in the dept. of Aveyron, S. France, on the R. Enne and the Orleans railway. In the vicinity are extensive coal and iron mines, the former of which have been worked since the Middle Ages. Pop. of com. 7,500.

**Aubonne, Baron d',** see TAVERNIER, JEAN BAPTISTE.

**Aubrey, John** (1626-97), Eng. antiquary, b. at Easton Percy in Wiltshire. His early education was given him at the neighbouring tn. of Malmesbury, at the grammar school which was then under Robert Latimer. In 1642 he entered Trinity College, Oxford, and in 1646 became a student of the Middle Temple, though he was never called to the Bar. In 1652, on his father's death, he succeeded to large estates, the subject, however, of innumerable lawsuits which eventually left him without any means of support, 1670. From this time he visited his friends, journeying from house to house till, in 1697, he d. at Oxford.

Only one of his works, the *Miscellanies*, was pub. in his lifetime (1696), but he left a large mass of material which was ed. by others. His *Lives of Eminent Men*, given to Anthony & Wood as material for his *Athenae Oxonienses*, appeared in 1813, and his *Remains of Gentilisme and Judaïsme* in 1831. His *Natural History and Antiquities of the County of Surrey* had already appeared in 1719. The *Miscellanies* (stories about dreams, ghosts, and visions) are full of interesting chatter, but A.'s extreme credulity and his appetite for folklore and gossip sometimes make them unreliable. His valuable and entertaining *Brief Lives of Contemporaries between 1669 and 1696* was ed. for the Clarendon Press in 1893 by Rev. Andrew Clark from the MSS. in the Bodleian.

**Aubriet, Claude, a Fr. artist, b.** at Châlons-sur-Marne about 1635. He succeeded Jean Joubert in 1700 as painter for the Jardin du Roi. He is noted for his beautiful illustrations of natural hist. on vellum, and many of his works are preserved in the National Library.

**Aubrieta, a genus** of herbaceous plants of the order Cruciferae. *A. deltoidea*, the purple rock cress found in Brit. gardens, is a native of central Italy, Greece, Asia Minor, and Syria.

**Aubriot, Hugues, was b.** at Dijon in the early part of the fourteenth century. He was made provost and captain of Paris in 1364 by Charles V. and in his 17 years of power did a great deal of good to the city. Built the Bastille, 1369. He made many enemies by his honesty and upright dealing, and was condemned by the bishop's court to imprisonment for life in the Bastille after Charles V.'s death. He escaped, however, in 1382, and retired to Bourgogne, dying in the same year.

**Aubry de la Boucharderie, Count Claude Charles** (1773-1813), general of artillery, was b. at Bourg. He fought in several campaigns, of which the chief was the expedition to Moscow, during which he constructed the famous bridge over the Beresina. He was slain at Leipzig in 1813.

**Aubry de Montdidier, a nobleman** of the court of Charles V. of France, assassinated in 1371, it is said, by his companion Richard Macaire. A's dog displayed afterwards the most determined animosity to Macaire, and the king, his suspicions being roused, ordered a combat between the two. The dog, says the popular story, was the victor, and Macaire died on the scaffold.

**Auburn:** 1. Co. seat of Cayuga co., New York, U.S.A., situated at the N. end of Owasco Lake; has manufs. of wool, silk, carpets, boots, paper, etc., and also makes agric. machinery on a large scale. Here there is a state prison, founded in 1816, which accommodates over 1000 prisoners; there are also a state asylum and armoury, and the A. Theological Seminary (Presbyterian), opened in 1821. Pop. 37,000. 2. The co. seat of Androscoggin co., Maine, U.S.A.; it manufs. boots and shoes. Pop. 19,000.

**Auburn-Lissoy, a vil.** in par. of Kilkenny W., co. Westmeath, Eire, 6 m.

N.E. of Athlone, near Lough Rea. It is noted as being the 'Auburn' of Goldsmith's *Deserted Village*, but Austin Dobson, in his *Goldsmith*, like Macanlay, refuses to accept this. See *Goldsmith's Poems and Plays* (Everyman's Library).

Aubusson, the cap. of the Fr. dept. of Creuse, is situated at the junction of the Creuse and the Bauze. A pretty and well-constructed tn., it manufs. cotton and woollen goods, and has a trade in salt. It is celebrated for its weaving of carpets and tapestry.

Aubusson, Pierre d' (1423-1503), a grand master of the order of St. John of Jerusalem. He served under the Emperor Sigismund and the Dauphin, afterwards Louis XI. He joined the order of the Knights of Rhodes, was signally successful against the pirates of the Levant, and successfully resisted Mohammed's siege of Rhodes in 1480. He perfidiously kept captive Jem, one of the brothers claiming Mohammed's throne, until the other brother, Bayezid, was successful, when he handed Jem over to Pope Innocent VIII. in 1489. He was rewarded by being made a cardinal.

Aucassin and Nicolette are 2 lovers in a medieval romance (Arabic in origin and Provençal in setting), in mixed prose and verse, of the thirteenth century (it is included in Moland and Héricault's *Nouvelles du 13<sup>e</sup> et du 14<sup>e</sup> siècle*). It resembles the story of the much more popular *Florie et Blanchefleur*. A. was the son of the count of Beaucaire; N., though brought up by Saracens from an early age, and looked upon as a slave, was in reality the daughter of the king of Carthage. In a simple and touching narrative the story of their vicissitudes, their long separation, and their final happiness is realistically told. Sedaine wrote the libretto for an opera by Grétry, which was first performed in 1779. Other composers, including Enna, the Dane, have set versions of the story. See *Aucassin and Nicolette* (Everyman's Library).

Auch is the cap. of the Fr. dept. Gers. The Augusta Auxorum of the Romans, it is built on a hill, topped by one of the finest Gothic cathedrals in France. It is the seat of an archbishop, has manufs. of woollen and cotton goods, and a trade in wines and Armagnac. Pop. 13,000.

Auchel is the name of a tn. in the Fr. dept. of Pas-de-Calais, situated 10 m. S. of Béthune. Pop. 13,000.

Auchenia (Gk. *αὐχην*, neck), the scientific name of the llama (*q.v.*), a ruminant of the family Camelidae and order Ungulata. It is smaller than the camel, has woolly hair, no hump, is very vicious.

Auchinleck, a tn. in Ayrshire, Scotland, is situated 15 m. E. of Ayr. In the par. is A. House, the seat of the Boswell family. Pop. 7000.

Auchinleck, Sir Claude John Eyre (b. 1884), Brit. soldier, b. in Ulster, son of Col. John Claude A., R.A., educated at Wellington College. Served in Egypt, 1914-15, and elsewhere in the Middle E. during the First World War. Mohmand operations, 1935. Deputy Chief of General Staff Army Headquarters, India,

1936-38. G.O.C. Southern Command, 1940. Earned the reputation of an expert in mountain warfare before the outbreak of the Second World War. Was commander-in-chief in India in the early part of the war; in July 1941, when Gen. (later F.M.) Wavell relinquished the chief command in the Middle E., A. succeeded to that command, and at a time when the Brit. forces were still inadequately equipped. On Nov. 18 (1941) A. launched a new offensive. It snatched victory at Sidi Rezegh, relieved Tobruk, and, on Dec. 24, recaptured Benghazi; but it failed before the lines at El Aghella, and a Ger. counter-offensive threw it back to Gazala in the middle of Cyrenaica. After some months' quiescence, Rommel (*q.v.*) attacked; Tobruk fell, and the Brit. retreat continued to El Alamein, when Gen. (later F.M.) Montgomery succeeded A. A. then became commander-in-chief in India for the second time, and it is probable that his greatest service in the course of the war was that he rendered in India when the whole responsibility for the administrative background to the campaign in Burma lay upon him. He won the confidence of the Indian Army, and his flair for the political work which fell to him made him equally successful in council. Promoted to field marshal, June 1, 1946. Commander of the combined force operating in the Punjab, 1947. Retired soon after the declaration of Indian independence.

Auchterarder is a tn. in Perthshire, Scotland, 14 m. S.W. of Perth. It was the opposition to the presentee to the church of A., in 1839, which began the contest leading to the formation of the Free Church of Scotland. A. manufs. tweeds and tartans. Pop. 3100.

Auchtermuchty is a royal and police burgh of Fife, Scotland. Native place of John Glas, founder of sect of Glassites in 1387. Weaving and distilling are carried on here. Pop. 1700.

Auckland is the name of a prov. of New Zealand, and also of the cap. of that prov. The prov. of A. includes practically a half of the N. Is., being 400 m. long and 200 m. wide at its greatest breadth. Area, 25,400 sq. m. The bays of its coast-line afford safe harbours, whilst its rvs. convey the produce of the interior to its ports. It is formed into 3 divs., the N. peninsula, the E. coast dist., and the Waikato country. The soil is of 2 kinds, a light volcanic loam and a stiff yellow clay. A. is rich in minerals, gold, copper, tin, iron, and coal being found; the kauri pine, of which also the fossil gum is exported, flourishes abundantly. The climate is pleasant and healthy. N. of the city of A. conditions are almost sub-tropical. In winter the prevailing winds are N. and W.; changes to the S.W. or S.E. mostly account for the rainfall. Southward, of A. city the climate is more varied, the W. coast having more rain. In the winter months frosts, which are unknown farther N., occasionally occur at nights. Volcanic action has left effects on the land, and there are warm lakes and geysers 90 m.

S.E. of A.; nearer A. is an active volcano. The pop. of the prov. is about 488,000.

The city of A. is a seaport on the E. coast of the prov. in Eden co. It was founded in 1840, and was cap. of New Zealand till 1865. It has some fine buildings, including a univ. college (which forms part of the univ. of New Zealand), and it is the seat of a bishopric. It has splendid wharves and graving docks, and a harbour on the W. side in Manukan, only 6 m. distant. It is connected with all the chief centres of New Zealand by telegraph and wireless. In addition to its shipping trade, it has boiler and glass works, sawmills, sugar factories, etc. The pop. is 218,000.

Auckland, George Eden, Earl of (1784-1849), son of Baron Auckland (q.v.). He was a steady supporter of reform, and in 1835 was made governor-general of India. The successful beginning of the unfortunate Afghan war of 1838 won him his earldom.

Auckland Isles, a group of is. situated 180 m. S. of New Zealand, were discovered by the whaler *Brislow* in 1806. Enderby, Adams, and Auckland are the chief is. They are valuable as whaling stations, but have no settled inhab.

Auckland, William Eden, Baron (1744-1811), the third son of Sir R. Eden, baronet, of W. Auckland, Durham, was a prominent politician and diplomatist. He was chief secretary to the Irish viceroy, and in charge of a commission which treated with the Irish insurgents. As minister plenipotentiary to France he concluded a commercial treaty in 1786, and was afterwards ambassador to Spain and Holland, and postmaster-general. He was created Baron A. in 1793.

Auction, a method employed for the sale of property, which derives its name from the Lat. *auctio*, an increase, because the property was publicly sold to him who would offer most for it. The usual form of A. is to offer the property at a low figure, and by the competition of the various bidders, each offering a little more than the predecessor, to raise the price to that point beyond which the bidders refuse to go. The goods are then 'knocked down' to the highest bidder. The Dutch A., originating, as its name indicates, in Holland, is the reverse of this, and is a method generally employed by the cheap-jack. The property is offered at a higher price than is likely to be paid for it, and the price is gradually lowered till somebody bids for it. The first person to bid gets the property. The mere offer of a bid does not bind the bidder until the auctioneer brings down his hammer, which is the equivalent of accepting it. Until such time a bidder may, if he chooses, withdraw his bid. It has been laid down that the buyer of goods at an A. is not bound to perform his contract if he was the only bona fide bidder at the sale, and if public note was not given of the intention of the vendor to bid. This applies even though his agent was authorised to bid only to a certain sum. This rule is to protect purchasers against the practice of employing

persons to make mock biddings with a view to raising the price by their apparent competition. The acceptance of a bid is generally indicated by the auctioneer striking his rostrum with a small hammer (wooden), but sometimes lighted candles are employed to measure the time during which bids will be entertained. The length of candle generally employed is 1 in., and the last bidder before the light expires is the purchaser. Yet another method employed is the running out of sand in the sandglass. Formerly excise duties were payable on sales by A., being first imposed during the Amer. war of Independence, in 1777. As much as £329,000 was raised by this means in one year, but in 1845 the duty was repealed. In 1927 Parliament, feeling the need for further control of As., passed the Auctions (Bidding Agreements) Act, 1927. This was directed against the evil of the 'knock-out'; in other words, the prior agreement between a ring of possible bidders that one only of their number should make a bid and that the advantage gained by this course of action should be shared by the members of the ring. The Act directs that, under a penalty of £20 for non-compliance, the name and address of the auctioneer, together with a copy of the Act, shall be exhibited before and during the sale.

*Auctioneer's Powers and Duties.*—The auctioneer's duty is previously to the commencement of every sale to intimate to intending purchasers the conditions under which the sales take place, but for the purposes of the Act it is considered sufficient if these conditions are posted up in the A. room. Every auctioneer is required by the Auctioneers Act, 1845, to take out an ann. licence, which expires on July 5, and for which £10 is paid, but the same statute specifically exempts certain sales. Such sales include goods sold under a distress for rent when the amount does not exceed £20. In such cases the sale may be conducted by the bailiffs without a licence. The penalty for selling goods by A. without a licence is £100, but the lack of a licence does not render such a sale nugatory. The ordinary licence entitles the holder to act as an appraiser also, but for the sale of dutiable goods an additional licence is required. An auctioneer has certain statutory exemptions and liabilities. Thus he is held responsible for the safe custody of goods entrusted to him for sale, and he is liable to an action for selling goods to which the person who employs him has no title, though in this matter he is afforded some relief by the Factors Act. He is debarred from purchasing for himself the property he exposes for sale. On the other hand, the auctioneer himself has power to sue the bidder for fulfilment of contract, and has a lien on the vendor's goods for his commission and expenses. If the vendor sells the goods by private sale after the auctioneer has unsuccessfully exposed them for sale, then the auctioneer is entitled to a commission as if he himself had sold them. He is also not liable to the vendor for the price

bid for the goods until he has received it. The number of licensed auctioneers in the United Kingdom exceeds 8000, about three-quarters of whom are members of the Auctioneers' and Estate Agents' Institute, London. The institute, which watches carefully all legislation affecting its members, was founded in 1886.

**Auction Bridge.** In this popular modification of the 4-handed game, the dealer is the first to call, either a bid or a pass, thus opening the A. Each player in succession to the left then calls; he may pass, double, or increase the bid. An overcall means a declaration to take tricks of higher total value, but more tricks in a lower suit may constitute an overcall even if the value is only equal; thus, a 2-club call takes precedence of a 1-heart call. This is known as 'value calling,' but there is an optional method, 'majority calling,' which is recognised as optional, but not preferred, by the Portland Club (*see* revised laws, 1928). Majority calling is, however, universal in the U.S.A., the Eng. method not being used there at all. 'Majority calling' means that the number of the tricks contracted for, irrespective of their suit, and not their value decides the bid. The bidding or doubling continues until all are satisfied, when the final declaration determines trumps, and that partner who originated the call in that suit becomes 'dealer,' and his vis-a-vis dummy. Doubling does not affect declarations, but only the score. If the declaration is won, the winners score the value of tricks above 6 below the line. If the declaration has been doubled, a bonus of 50 is scored in the honour column, and 50 points for each over-trick. If the winner or his partner has redoubled, the bonus is doubled. If the declaration fails, nothing is scored below the line, but the adversaries score in the honour column 50 for each under-trick, or 100 or 200 if the declaration has been doubled or redoubled. The loss of a 1-spade declaration is limited to 100 points. Honours are scored as in ordinary B. Grand slam counts 100 points, little slam 50 points. Chicanes is abolished. The tendency of A. B. to force itself to a no-trump declaration has led to a new count, in which clubs count 6, diamonds 7, hearts 8, spades 9, no trumps 10. The general result of the new count is to equalise the values of the blacks and reds, and to make it possible to overcall even a strong no-trump declaration. 250 points are added for rubber.

**Aucuba**, a genus of Cornaceæ, a dioecious plant native to Asia. *A. japonica*, the Japan laurel, is cultivated in Britain as a hardy evergreen shrub.

**Aude**, a maritime dept. in the S. of France, is formed from part of the anc. prov. of Languedoc. It takes its name from the R. Aude, which crosses it. It is bounded on the E. by the Mediterranean, on the N. by the depts. Hérault and Tarn, on the N.W. by Haute-Garonne, on the W. by Ariège, and on the S. by the Pyrénées-Orientales. The S. portion is occupied by the spurs of the Pyrénées, reaching 4037 ft. in altitude;

in the N. the offsets of the Cévennes reach 4018 ft. The greater portion of the dept. lies in the valley of the lower A. The coast is very flat, no bays being found, but sev. lagoons. The soil of the plain is chiefly calcareous, but fertile, cereals, fruits, and wines being produced. There are iron and manganese mines and stone quarries; and wild animals, game, and fish are abundant. The climate is warm and pleasant on the whole, but varies to a considerable extent. The manufs. of woollen and silk are of considerable value, and cereals and honey are exported. The chief tn. is Carcassonne. The area of A. is 2448 sq. m., and pop. 68,900.

**Audebert, Jean Baptiste** (1759-1800), an eminent Fr. artist and naturalist, was b. at Rochefort, and studied at Paris. Having attained a reputation as a painter of miniatures, he turned his attention to natural hist., and in 1800 produced a hist. of the apes beautifully illustrated in colour. Two other works, on the humming-birds and the birds of paradise, the latter left unfinished, were pub. after his death. He was the originator of the method of using gold-leaf to depict the plumage of birds. *See* his *Oiseaux dorés ou à reflets métalliques*.

**Auden, Wystan Hugh** (b. 1907), Eng. poet and dramatist, now a naturalised U.S. citizen. Educated at Grosham's School, Holt, and Christ Church, Oxford. His importance as a poet has been said to lie in his synthesis of the typical thought and practice of poetry of his own time. Owes some of his best qualities to T. S. Eliot, but is more modern in his concentration on psychology and social doctrine. All his faults are implicit in the term 'contemporary poet.' 'the cheapness, the jazz, the slang, the easy thrills, the disrespect and slovenliness of a muddled age' (Francis Scarfe). But he corresponds to a marked state of mind of his generation, and there is hardly a young poet who is not indebted to him. His poetry has an intense belief in the future of man, which he presents emotionally; while the stir, savour, and hypocrisies of modern life are conveyed by mythological thinking, a sentiment for all manner of places and all kinds of people, and a characteristic power of brutal generalisation. It is significant of his psychological outlook that in his essay, *The Arts To-day*, he defends Freud's view of the artist as a social misfit, who tries to reconcile himself with society through his art. First pub. work, *Poems* (1930); then *The Orators* (1932), an attack on neurotics; and *The Dance of Death* (1933). His later work emphasises his interpretation of political and social problems in terms of psychology. His most sustained, perhaps the best of his poems, is *Spain* (1937), the argument of which is that Spain can only be saved by an internal effort, and that the individual conscience will in its turn be uplifted or cast down by the fate of Spain. A. has an element of mysticism in his psychology, and seems to waver between Marxism and the Freudian idea that social evils springs from psychic evil. In the collection

**Look, Stranger!** (1936) A.'s work is much matured, and he here shows a broader sense of community. Has adopted a fairly consistent pacifist attitude; his *New Year Letter* (1941) is an attack on Brit. political hypocrisy and Ger. apathy since the First World War. Married a Ger. woman and settled in the U.S.A., electing to stay out of the struggle of 1939. Has created no recognisable style, but has a large and vital vocabulary, and is sensitive to the musical qualities of words, as, e.g., in his well-known *Madrigal*. Has tried to write a poetry very close to common speech, and has succeeded in so doing. Has promise as a dramatist, as, e.g., in *The Dog beneath the Skin* (1935) and *The Ascent of F.6* (1936), the former a play with social implications, the latter turning on the Oedipus complex, both written in collaboration with C. Isherwood. Other works: *Some Poems*, 1940; *Another Time*, 1940; *For the Time Being*, 1944; *Tennyson*, 1946; *The Age of Anxiety*, 1947; and ed. *The Oxford Book of Light Verse*, 1938. Collaborated with C. Isherwood in *Journey to a War*, 1939, and with Louis MacNeice in *Letters from Iceland*, 1941. See F. Scarfe, *Auden and After*, 1942.

**Audenaarde** (Fr. Audenarde), Oudenarde, or Oudenardes, a tn. of E. Flanders prov., Belgium, on the Scheldt, 15 m. S.W. of Ghent. Its tn. hall dates from the sixteenth century. Once noted for its tapestries, it now manuf. linen and cotton, and has tanneries. Marlborough here defeated the Fr. under the dukes of Burgundy and Vendôme (1708). Pop. 6600.

**Audenshaw**, a Lancashire vil., 4 m. E. of Manchester. Pop. 8500.

**Audhumla** (Audumbla) is the name of the cow made by Surt, by whose milk the first created being, the giant Ymir, and his race were fed. The story comes from the Scandinavian mythology.

**Audians**, or **Audeans**, a sect of heretics founded by Audius or Audeus, who lived in the fourth century. He attacked the clergy and the gov. of the Church, and when he assumed the episcopal office was banished by Constantius to Scythia. The opinions and practices of Audius and his followers were: the celebration of Easter after the usage of the Jews; the admission of all persons indiscriminately to the Lord's Supper; the doctrine of the eternity of fire, water, and darkness, and especially that of anthropomorphism, or the resemblance of the Deity to the human form. Information of Audius has been obtained from Athanasius, Augustine, Epiphanius, and Theodoret, and not from Audius himself, or his followers.

**Audjelah**, see AUGILA.

**Audincourt** is a small industrial tn. in the Fr. dept. of Doubs, and the arron. of Montbéliard. It has an ironworks and an industry in iron. Pop. 10,000.

**Audiometer**, an adaptation of the telephone designed to measure the acuteness of hearing.

**Audiphone**, an instrument for communicating sound to the bones of the head. It consists of a plate of thin vulcanite bent and kept by strings under a certain degree

of tension. The edge is placed in contact with the front teeth, by which means sound is rendered audible to those whose auditory ossicles fail in their function.

**Audit Ale**, a strong ale of extra quality brewed for use at Oxford and Cambridge colleges on A. day.

**Audita Querela**, a form of action allowed to a defendant, against whom judgment has been rendered and who is thereby in danger of an execution, by which the execution may be recalled or prevented, and damages recovered, if he can show that some matter has occurred since judgment, which amounts to a discharge. In some of the states of the U.S.A. it has been superseded by the granting of summary relief upon motions.

**Auditor**, a person appointed to examine the accounts of the State, a public body or corporation, a company, or of a private person, and to certify that they are correct and properly kept. The duties of an A. are those of an accountant, and are in all cases of importance performed by a professional accountant. All payments and receipts must be proved by vouchers, but they must also certify to the accuracy of balance sheets and of the statements as to revenue, etc. (See ACCOUNTANT.) In the Companies Act, 1900, incorporated in the Act of 1908, strict provisions are made for the appointment and remuneration of As., and their rights and duties are clearly laid down. Before 1900 regulations as to the audit of company accounts were left to the articles of association, except in the case of joint-stock banks. The Society of Accountants and As. was incorporated in 1885. In the Brit. civil service the exchequer and audit dept. plays an important part. The comptroller and A.-general in 1866 replaced the comptroller-general of the exchequer and the commissioners for auditing the public accounts. As comptroller he authorises issues from the exchequer in accordance with accounts that have received parl. sanction, and authorises borrowings to meet deficiencies; he examines the daily accounts furnished by the Bank of England as to the payments paid to the exchequer account; as A.-general he ascertains whether money expended has been applied to the purpose for which it was granted, and generally verifies the public accounts and reports to Parliament. In the U.S.A. the central and state govts., together with the municipalities, have their accounts submitted to public As. The accounts of the Federal Gov. are audited by a comptroller-general, who is the chief official of the general accounting office. The comptroller-general operates through an audit div., which is quite independent of the executive gov., being solely responsible to Congress direct. With the exception of the accounts of the Post Office, which are audited by their own As., the post office div. (co-ordinated with the audit div.), all the central gov.'s accounts are submitted to the comptroller-general's dept. The Fr. public audit dept. is styled *Cour des Comptes*; the Ger. *Rechnungshof*. In

Scotland, an A. of the court is equivalent to the Eng. taxing-master.

**Auditory Nerves**, the special nerves connected with the sense of hearing. They rise from the *medulla oblongata* as the eighth pair, or, according to some anatomists, the *portio mollis* of the seventh pair, of cranial nerves, and pass downward to the ear. See **BRAIN** and **EAR**.

**Audley** is the name of a Staffordshire par.,  $\frac{1}{2}$  m. N.W. of Newcastle-under-Lyme. It has a pop. of 15,000.

**Audley, Sir James**, was one of the original knights of the order of the Garter, which was founded in 1344 by Edward III. He greatly distinguished himself at the battle of Poitiers, was governor of Aquitaine in 1362, and great seneschal of Poitou in 1369. He *d.* in 1369 at Fontenay-le-Comte.

**Audley, Thomas** (1488-1544), was an Essex man, whose precise genealogy is unknown. He is thought to have studied at Magdalene College, Cambridge. He was autumn reader in the Middle Temple in 1526. He afterwards became a member of Wolsey's household. In 1529 he became Speaker of the House of Commons, and by means of his servile submission to Henry VIII. he obtained the lord chancellorship in 1533.

**Audouin, Jean Victor** (1797-1841), an eminent Fr. entomologist, was *b.* at Paris. He began to study law, but his strong natural inclination led him to the study of the natural sciences, and of medicine. He was made prof. of entomology at the Jardin des Plantes in 1833. He made the study of insects his speciality, and wrote on this subject and on the natural hist. of the coasts of France. His chief work, *Histoire des insectes nuisibles à la vigne*, was continued after his death by Milne-Edwards and Blanchard and pub. in 1842.

**Audran, Edmond** (1842-1901), a Fr. musical composer, was *b.* at Lyons. He was originally intended to enter the church, but his tastes were for the musical profession, and he became a church organist at Marseilles. He was first brought into the popular notice by his operetta *Le Grand Mogul*, which was produced in 1864. He afterwards produced a number of melodious, light, and graceful vaudevilles and comic operas, such as *La Poupée*, *La Cigale*, etc.

**Audrian, Gérard** (1640-1703), a Fr. engraver, *b.* at Lyons, and studied in Rome. He obtained considerable fame by his engraving of Pope Clement IX., and was appointed engraver to Louis XIV.

**Audubon, John James** (1780-1851), a celebrated Amer. ornithologist, *b.* in Louisiana. He was educated at Paris, and studied drawing under David. His father estab. him on a plantation in Pennsylvania, and in 1808 he married the daughter of a farmer, Miss Lucy Bakewell. His ardour for the study of natural hist. was indomitable. Annually for 15 years he explored the primeval forests of America, and as he was able to transfer the results of his labours to paper with a spirited hand, his works have great value. His *Birds of America*

(1827-38) was praised in enthusiastic terms by Cuvier. He was of an unassuming and deeply religious nature, handsome in form and feature, and of a keen and clear-sighted intelligence. See *Life* by Buchanan (Everyman's Library).

**Aue**, a Ger. industrial tn., 13 m. S.E. of Zwickau, which had a technical school connected with the tin plate industry; pop. 19,000.

**Auenbrugger von Auenbrug, Leopold** (1722-1809), a physician, *b.* at Graz in Styria. He became physician to the Sp. nation in the Imperial Hospital of Vienna. His work, entitled *Inventum Novum*, 1761, gave an account of his discovery of an application of the laws of acoustics to the investigation of the phenomena or action of the internal parts of the human body, i.e. his work first introduced percussio (*q.v.*) as a means of detecting chest diseases. It has been trans. into Fr. by Rozière, 1770; by Corvazart, 1808; and into Eng. by Dr. Forbes of Chichester, under the title *Original Cases*, London, 1824. A. also wrote a work on madness, in Lat., 1776.

**Auer, Hans** (1847-1906), a Swiss architect, carried on his profession and taught in Vienna. The federal administrative offices and house of parliament at Bern were designed by him, and he was made professor of architecture there in 1890.

**Auer, Leopold** (1845-1930), Hungarian violinist, *b.* at Veszprém. Studied at Budapest under Köhne, and at Hanover under J. Joachim. In 1863 he was leader of the orchestra at Düsseldorf; in 1866 at Hamburg; and in 1868 imperial solo violinist at St. Petersburg and prof. of the violin at the conservatoire there. From 1867 to 1892 he led the concerts of the Russian Imperial Music Society; in 1895 he was ennobled; and in 1903 created Staatsrat. Later, he lived in Dresden. In 1918 he went to New York, where he pub. *Violin Playing as I teach it* (1921). Also wrote an autobiography, *My Long Life in Music* (London 1924).

**Auerbach, Berthold** (1812-82), an eminent Ger. author of Heb. extraction, *b.* at Nordstetten in the Black Forest in 1812. He was educated at the Talmud school of Hechingen, and at the univ. of Hohenasperg, Munich, and Heidelberg. He was imprisoned for sev. months in the fortress of Hohenasperg as a member of the students' association. He originally studied theology, but later turned to law, and from law to hist. and philosophy, making a special study of Spinoza. He made his name in 1843 with a vol. of vil. stories, *Schwarzwälder Dorfesgeschichten*. Unrivalled in his studies of peasant life in the Swabian side of the Black Forest. Some of his stories of broken love and disappointed passion are suggestive of Thomas Hardy. His later philosophical novels, mostly concerned with the evolution of the thought of individuals, are clever, but tedious.

**Auerbach's Keller**, a wine cellar in A.'s tavern in Grimmelshausen Strasse, Leipzig. It forms a scene in the Faust legend, and appears in Goethe's *Faust*. Two sixteenth-



century mural paintings of incidents in the story were to be seen in this cellar.

**Auersperg**, Anton Alexander, Count of (1806-76), an Austrian poet, b. at Lallbach. He was elected a member for life of the Upper House of the Austrian Reichsrath in 1861. In political affairs he was distinguished by his liberalism and his Ger. leanings. It is, however, under his *nom de plume* of Anastasius Grün that he is best known, his humorous poems and political satires reaching a very high standard. He d. at Graz.

**Auerstadt**, the name of a little vil. in the prov. of Saxony, 10 m. W. of Naumburg. The Fr. army under Davout routed the Prussians with heavy loss here on Oct. 14, 1806. Pop. 600.

**Auerstädt**, Duke of, see DAVOUT.

**Auffenberg-Komarov**, Moritz, Freiherr von (1852-1928), Austrian field-marshal (1905), and war minister (1911-12); b. at Troppau, son of Hofrath Auffenberg. Took part in occupation of Bosnia, 1878; in charge at Sarajevo, under Archduke Franz Ferdinand (q.v.). With the Fourth Army he was victorious at Komarov, Sept. 1914; but his force proved unable to cope with superior numbers of Russians at Lemberg later. In 1915, tried for alleged irregularities as war minister, and acquitted. A contributor to the *Ency. Brit.*

**Aufrecht**, Theodor (1822-1907), a noted philologist, b. at Leschnitz in Upper Silesia. He studied at Berlin, settled there in 1850, and devoted himself to the study of Sanskrit and the old Ger. language. He aided Max Müller with his ed. of the *Rig-Veda*, and wrote *Die umbrischen Sprachdenkmäler*, 1849-51, a book on the comparative philology of old It. languages. He was appointed to a place in the Bodleian Library, of which he compiled a catalogue. In 1862 he was

appointed prof. of Sanskrit and comparative philology at Edinburgh; in 1875 he resigned this post for the professorship at Bonn. He brought out scholarly eds. of sev. Sanskrit classic works.

**Augarten**, a fine park in the Fr. style in Vienna, Austria. It extended over 125 ac., and was opened to the public by the Emperor Joseph II. in 1775. It was formerly noted for its musical associations,

concerts having been started there by Mozart in 1782.

**'Auges**, see HERCULES.

**Augan Stables**, see HERCULES.

**Auger**, a carpenter's tool for boring holes in wood; also a tool for boring in the earth.

**Auger**, Athanas (1734-92), was a dis-

tinguished Fr. classical scholar. He early applied himself to the study of the Gk. and Rom. writers, and was appointed prof. of rhetoric in the college of Rouen. Amongst his translations are those of Demosthenes and Æschines, 1777; Isocrates, 1783; Lysias, select orations of Cicero, and selections from Chrysostom and Basil. He also wrote an essay on the constitution of Rome, *De la constitution de Rome sous les rois et au temps de la république*, pub. after his death as an introduction to the whole of Cicero's orations, 1792-94; *Projet d'éducation publique, précédé de quelques réflexions sur l'Assemblée nationale*, 1789; and *Catéchisme du citoyen français*, 1791.

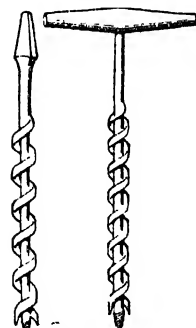
**Augereau**, Pierre François Charles, Duke of Castiglione (1757-1816), marshal of France, b. in Paris. He served in the Neapolitan army till 1787, and volunteered for the Fr. army in 1792. His conduct in Vendée and the Pyrenees was so brilliant that he was general of div. in 1793. Sent to the It. army, he highly distinguished himself at Lodi, Castiglione, and Bologna. He took part in the *coup d'état* of Fructidor 18 (Sept. 4), and was a member of the Council of Five Hundred in 1799; in 1804 he was created marshal of the empire and grand officer of the Legion of Honour. He submitted to Louis XVIII. on Napoleon's abdication, and was created a peer.

**Aughrables Falls**, on the Orange R. in S.W. Africa, about 25 m. E. of the E. boundary, in Cape Prov. They are 320 ft. in height or about twice as high as the Niagara Falls, but the latter are much wider and have a greater flow of water.

**Aughrim**, see AGHRIM.

**Augier**, Guillaume Victor Émile (1820-1889), a Fr. dramatic poet, was b. at Valence. He was educated as a lawyer, but soon turned his attention to literature. Collaborated with Musset, Labiche, and Sandeau. Among his plays are *Le Fils de Giboyer*, 1863; *Contagion*, 1866; and *Les Éffrontés*, 1893; all satires on avarice, social demoralisation, and lust of power; *Mariage d'Olympe*, showing the idealised courtesan, 1855; *Jern de Thommeray* (with Jules Sandeau), 1873, sounding the note of patriotism, following Fr. reverses in 1870; and *Les Fourchambault*, 1878, on the Dumas model. His *Le Gendreau de M. Poirier*, 1854 (prose), also with Sandeau, still holds its place. He was not inclined to paradox, and was not easily influenced by chimeras, but defended the commonsense view against sophistry. He did not, however, take up the attitude of a reformer or an apostle. His verse is not that of a great poet, but has fine dramatic qualities. He was made a member of the Academy in 1858, a commander of the Legion of Honour in 1868.

**Augila**, Ajulla, or Audijelah, is an ill-built, dirty tn., situated in an oasis of the desert of Barca, in 29° 18' N. lat. and 21° 53' E. long. It is in the track of caravans travelling between Cairo and Fezzan. The oasis of A. is under the dominion of the beylik of Benghazi, which is a prov. of the regency of Tripoli. The vil. of



AUGERS

Mojabra and Meledia are also situated in the oasis. Though the surrounding country is flat and sandy it is well tilled and laid out in gardens.

**Augite** (Gk. *αὔγη*, lustre), an important mineral belonging to the pyroxene group, which commonly forms rocks. It is often found in volcanic rocks. It is green when in fibrous masses, black when it crystallises, and is distinguished from hornblende by its crystals, which are smaller and thicker.

**Augmentation** is used with special significance in heraldry, in music, and in Scottish law.

In heraldry, an additional charge to a coat-of-arms was known as an A. The right to add such a charge was conferred as a mark of honour.

In music, especially in counterpoint and fugue, A. is the name given to the repetition of the subject in notes of twice the original length.

In Scottish law, an increase of stipend obtained by a par. minister in the court of teinds by a process of A. against the titulars and heritors was known as an A. See also **BENEFICE**; **TENDS**.

**Augmentation, Court of**, a court set up by 27 Henry VIII. c. 27, for the purpose of managing the revenues and possessions of all monasteries under £200 a year, which by an Act of the same session had been given to the king, and for determining suits relating thereto. The origin of the title of this court is seen by referring to its full title, 'The Court of the A. of the revenues of the King's Crown.' It was a court of record, with one great seal and one privy seal. All the dissolved monasteries under the above value, except those preserved incorporately, were in survey of the court, and the chancellor of the court was directed to make an annual report of their revenues to the king. The yearly revenue of 376 monasteries under £200 a year, which were suppressed, was £32,000, and the value of their goods and chattels, etc., was estimated at £100,000.

**Augsburg** is a historic city of Bavaria, situated at the junction of the Wertach and Lech rivs., 37 m. W.N.W. of Munich. It was founded by Augustus in 13 B.C. and named Augusta Vindelicorum. It became the cap. of the prov. of Rhaetia, but was laid waste by the Huns in the fifth century. It next came under the dominion of the Frankish kings, and in Charlemagne's war with Thassilo of Bavaria it was again destroyed. It became a free city of the empire in 1276, and reached the summit of its prosperity in the latter half of the fourteenth century. It was important, however, in the sixteenth and seventeenth centuries, though the discovery of the road to India by the Cape, and of America, caused the commerce of the world to flow through new channels and dried up the sources of A.'s prosperity. Many diets of empire were held there, and it continued to be important for commerce, manufs., and art till the war between Charles V. and the Protestant league of Schmalkald in 1540. It now presents rather a de-

serted and antique appearance, but has some fine streets and squares, and numerous handsome buildings. The cathedral, the work of sev. generations, was begun at the end of the tenth and finished in the fifteenth century. The town hall, one of the most beautiful architectural monuments of Germany, contains the famous golden hall, in which public ceremonies took place. Amongst other notable edifices are the church of St. Ulrich, and the episcopal palace, formerly an imperial palace. Before the Second World War A. was known as the chief centre of the textile industry, and it produced agric. and industrial machinery. Subsequently it became an important aircraft manufacturing centre. It also had important chemical works. It was bombed sev. times by the R.A.F., twice at night in Aug. 1940 and again, by daylight, on Apr. 17, 1942, a flight involving a journey by heavy bombers of over 1000 m. across enemy ter. Seven of the 12 bombers were lost. S./Ldr. Nettleton was awarded the V.C. for his part in the raid. Pop. 185,000.

**Augsburg, Confession of**, was the name given to the formula, drafted by Luther and modified and revised by Melancthon, which contained the confession of faith of the Protestants, and which was presented by them to the Emperor Charles V. at the diet of Augsburg in 1530. The original form was adhered to by the Lutherans, then altered by the Ger. Reformed Churchmen. The original document presented to the diet is preserved in the Austrian archives.

**Augsburg Interim** is the name of a document which Charles V. caused to be drawn up by the theologians of both sides, at a diet meeting at A. in Sept. 1547. He hoped by this to restore the unity of the Church, but though the Interim was accepted by the diet, neither Romanists nor Protestants would agree to it.

**Augur.** The Rom. college of A.s. foretold events and interpreted the will of the gods from various signs and omens. Such were thunder and lightning, the flight and song of certain birds, the appetites of birds, particularly chickens, the movements and attitudes of beasts and reptiles, and incidents occurring at the moment when a magistrate performed some public act, or during an augural consultation. The answers of A.s., as well as the signs governing their utterances, were called *auguria*, *auspicia* being properly confined to divinations from birds. The political importance of the A.s. was very great, as nothing of any importance could be undertaken unless they were consulted, and they could postpone business at their pleasure. The number of the A.s., taken from the patrician class only till 307 B.C., was 4 until 81 B.C. In 81 B.C. the number was increased to 15, and Augustus elected A.s. as he pleased.

**August.** The month of A. was originally called *Sextilis*, being the sixth month in the Alban or Lat. calendar, and it retained that name in the calendars of Romulus, Numa Pompilius, and Julius

**Cesar.** When Numa reformed the calendar it became the eighth month of the year. In the Alban calendar *Sextilis* consisted of 28 days; in that of Romulus, of 30; in that of Numa, of 29. Julius Caesar restored it to 30, and Augustus Caesar, from whom it derived its new name of Augustus, extended the number of days to 31, which number it has since contained. The first day of A. is called *Lammas Day*, and also the *Gule of A.* The Anglo-Saxons called it *hlaf-mæsse*, loaf-mass, and it was the feast of thanksgiving for the first-fruits of the corn.

**Augusta**, the anct. name of a number of tns. in honour of the Rom. Emperor Augustus, or one of his family. Three considerable tns. at present are so called: (1) The cap. of Maine, U.S.A., and co. seat of Kennebec co., situated on the W. bank of Kennebec R., 45 m. from its mouth; a dam 17 ft. high gives it considerable water power which is utilised in cotton, paper, and pulp mills. There is a U.S. arsenal. Pop. 17,198. (2) The co. seat of Richmond co., Georgia, U.S.A., is the head of the steamboat navigation on the Savannah R. It is a popular health resort, and is one of the largest cotton markets in the S. Other industries are gun-founding and sash, door, and blind manufs. Pop. 60,204. (3) A tn. in the Syracuse prov. of Sicily, situated on the is. of Xiphonia, but is now joined to the mainland by a bridge. It was founded by the Emperor Frederick II. in 1232, and rebuilt in 1693, after having been destroyed by an earthquake. It is a fine fortified port, has large salt works, and produces cheese, fruit, honey, and sardines. Van Ruyter, the Dutch admiral, was killed here in 1676. Pop. 17,000.

**Augusta Emerita**, see *MERIDA*.

**Augusta Historia**, the name given to a series of biographies of the Rom. emperors from Hadrian to Carinus, a period of 167 years. The 6 writers generally included in the collections of the A. H. are *Ælius Spartianus*, *Julius Capitolinus*, *Ælius Lampridius*, *Vulcatius Gallicanus*, *Trebellius Pollio*, and *Flavius Vopiscus*, who lived under Diocletian and his successors, Constantius and Constantine. Among the eds. of these writers is that of Cl. Salmasius, Paris, 1620, and the Bipontine ed., 1787.

**Augustales** was the name by which the games held at Rome and in other parts of the empire, in honour of Augustus, were described. By a decree of the senate in 11 B.C., they were celebrated annually on the birthday of Augustus. The name A. was also that of a body of priests which was founded by Tiberius in order to attend to the worship of Augustus and the gens Julia. It was divided into 2 classes, one at Rome and the other in the municipia; the former class, 21 in number, was selected from the nobility of Rome, and was also augmented by certain members of the imperial family; the latter class was usually composed of wealthy libertini. They formed a collegium, and were appointed by decuriones,

or senate of the municipia. The 6 chief members of the order were called *seviri*.

**Augustan Age**, a term referring to that epoch in Rom. hist. when the national greatness, especially in literature, reached its highest point, under the Emperor Augustus. Other nations also have boasted their A. As., as in England, the period of Queen Anne's reign—the 'classical' age of Eng. literature adorned by Swift, Addison, Pope, etc.; and in France the time of Louis XIV. with Corneille, Molière, and Racine.

**Augusta Suessionum**, see *SOISSONS*.

**Augusta Taurinorum**, see *TURIN*.

**Augustenburg**, a small seaside tn. in Alsace ls., Slesvig, Dan. since Austria's proposal in 1865 to make the prince of A. ruler of Schleswig-Holstein was one of the ostensible causes of the Seven Weeks war between Austria and Prussia.

**Augusteo**, the famous concert hall in Rome, and the most important in Italy. Built on the ruins of the mausoleum of Augustus. Last century it was used for popular spectacles and then closed. The Rom. municipality converted it into the present magnificent hall, inaugurated in 1908, and the orchestral and choral concerts previously held in the hall of Santa Cecilia were transferred to the A., and very soon it became the centre of the lt. musical movement as far as symphonic works are concerned. All the greatest conductors and concert artists have appeared there. The hall belongs to the municipality and is managed by the Royal Academy of Santa Cecilia.

**Augusti, Johann Christian Wilhelm** (1772-1841), Ger. theologian of Jewish descent, was educated at Götting and Jena. He studied oriental languages, and was prof. successively at Jena, Breslau, and Bonn; later he became chief of the consistorial council at Coblenz. His most important writings are volumes on Christian archaeology, and on the exegetics of the O.T.

**Augustine, St.** (354-430), the greatest father of the Lat. Church, b. on Nov. 13, A.D. 354, at the tn. of Tagaste, in the prov. of Numidia, of poor parents. His father Patricius, was a pagan, but his mother instructed him in the broad outlines of the Christian faith, and of his mother we are left a magnificent picture from the skilful pen of her son. As a boy he showed promise, and his education was carefully looked after, both his parents taking considerable interest in it. He was educated partly in his native tn. and later in the tn. of Madaura, whence he returned at the age of 18 to his native home. In spite of the teachings of his mother, and at one time of his own desires, he grew to manhood without being received into the Christian Church. Before he was sent to the univ. at Carthage his father d., having been at last induced to become a Christian. By the help of a fellow townsman, Romanus, he was at last sent to the univ. at Carthage. It was during his univ. career at Carthage that A. formed that illegitimate connection with a young woman by whom he had a son, Adeodatus

(given by God). This union, unlawful as it was, continued for some 14 years, whilst A. was always passionately fond of his son. He had during his period of study been devotedly attached to the Lat. poets and writers, although his acquaintance with Gk. was so small that it has been doubted whether he was able to read the Gk. gospel in the original. The *Hortensius* of Cicero had great influence on his career, giving him a desire for wisdom, and showing him the folly of the life he had been leading. Manichæism, the so-called Higher Christianity, was the first philosophy that he embraced. At first he set up as a teacher of grammar



ST. AUGUSTINE  
A painting by Botticelli.

in his native town, but he soon returned to Carthage. His study of psychology soon led him to doubt Manichæism, and after a short stay as a tutor in Carthage, he set out for Rome, where again, after a short illness, he was disgusted with the mannerisms of the students, and left there in order to become the prof. of rhetoric at Milan. At Milan we get the beginning of his definite break with the Manichæans, and for a time he fell under the influence of the philosophy of the Sceptics; but the oratory of Ambrose, bishop of Milan, gradually drew him under its influence, and although at first it was only the oratory, later the divine message of the preacher began to have its influence also. He studied the Pauline epistles, and now he began to see the divinity of the Christian call, and he ended by retiring into seclusion and announcing himself as a candidate for baptism. The conversion of St. A. may be said to date from the summer of 386, in his thirty-third year.

He was baptised with his friend Alypius and his son Adeodatus. A few

days later his mother, who had rejoined him, *d.* at Ostia. A. did not immediately return home to Tagaste, he remained for some time in Rome, but in 388 he returned to his native tn. Here was laid down the beginning of that rule of life which later developed into the monastic system of A., and which at this time he and a devoted band of followers carried out. He was speedily invited to take a more active share in the work of the Christian Church, but declined until about 390 he went to Hippo to visit some Christian friends, and was invited to become presbyter of Hippo, later coadjutor to the bishop, and finally bishop of the see itself. The rest of his life was taken up with the controversies which form such an important part of the influence and work of St. A. Not unnaturally his first great attack came against his first faith, Manichæism. The greatest of all these writings in his first controversy is *Contra Faustum Manichæum*, i.e. against Faustus of Milan, his old friend and associate. His second great controversy was against the Donatists. Although the doctrines of the Donatists, who took their name from a bishop of Carthage, set up as a result of the Diocletian persecutions, had been declared false by the bishop of Rome and by the Emperor Constantine, the party had made great progress and had excited the indignation of A. He vented his wrath in 7 books, *The Seven Books on Baptism*. In these and later writings A. in his wrath gave utterance to certain statements concerning the use of civil power to control separatism in the Church, which later ages misconstrued and misused.

A.'s greatest controversy, however, was against the Pelagian heresy. He himself, converted at a comparatively late age, held to a theology that was tinged with darkness, and therefore found himself in bitter opposition to Pelagius and Cælestius, who put forward the following opinions: that Adam's sin was purely personal and affected no one but himself, that therefore man is born pure and is only corrupted by temptation and frailty, and that children who die without baptism are saved. This controversy lasted for many years, and the doctrines of Pelagius were refuted in no less than 15 treatises. In these we have the Augustinian theories of original sin, the need for infant baptism, and the relation of human to divine righteousness; in all an attempt by A. to express the relations of the human and the divine. Amongst his greatest works are *De Civitate Dei* (The City of God), a vindication of the Christian Church, and his *Confessions*. *The City of God* was commenced in 413 and finished about 426. His *Confessions* begin with his elevation to the see of Hippo. His *De Opere Monachorum* had great influence on monastic work. The rule of St. A. was never formally laid down by him, but was culled from his writings during the monastic revival of the eleventh century. It is taken from his writings on community life. A. *d.*

during the great siege of Hippo by the Vandals in 430, before the city had the humiliation of surrendering. An early ed. of all A.'s works is that of the Benedictines, pub. in Paris, 1879-1800, and reprinted in 22 vols. in 1836; and, ed. by Pilkington and others, *Select Library of Nicene and Post-Nicene Fathers*, vols. i.-viii., 1887-92. A translation of the works, by Dr. M. Dods, was pub. 1871-76. There are also translations of A.'s works from many hands: *Confessions*, trans. by E. B. Pusey, 1838, and *The City of God*, trans. by John Healey, 1610, are in Everyman's Library. Lives: P. Schaff, *Life and Labours of Augustine*, 1854; J. MacCabe, *St. Augustine and his Age*, 1902; and M. I. Barry, *St. Augustine the Orator*, 1924.

**Augustine, St.**, first archbishop of Canterbury, was sent from Rome by Pope Gregory I. to undertake the conversion of the Eng., A.D. 596. With 40 monks he landed in the Isle of Thanet, and through the influence of Queen Bertha (already a Christian) was well received by King Ethelbert of Kent, who, however, would not at first receive the mission within doors for fear of magical arts. A. gradually won his confidence, and within a year or two Ethelbert and his people were converted. The chief seat of worship was at Canterbury, and the first regular services were held at the church of St. Martin, a relic of Rom. Christianity. Other churches rapidly arose, and in 601 A. received from Gregory the pallium as archbishop of Canterbury and primate of Britain. There was already a Christian community in the W. country, founded by the disciples of St. Columba, their prin. church being at Bangor, on the Dee. These declined to acknowledge A.'s authority, and a conference held at A.'s Oak (somewhere near the Severn) failed to convince them; but only a few years later the settlement at Bangor was utterly destroyed by the pagan Ethelfrid. As an administrator, A. seems to have been both firm and moderate. The date of his death is uncertain, but was probably between A.D. 604 and 610.

**Augustine, St., Canons of the Order of.** Until the Lateran synod, 1059, almost the only religious order in the W. church was the Benedictine. But the canons regular of St. A., founded soon after and in consequence of the Lateran synod, made a new departure. Taking for their guidance the rule of St. A. of Hippo, estab. by him about the end of the fourth century, they took religious vows and lived in communities, yet they were not monks, but clergy doing pastoral work. Their separate 'houses' soon began to draw together and organise themselves into 'congregations'; among the chief were those of the Lateran, Rome, of St. Victor, Paris, and of the Gilbertines, England. These congregations spread all over W. Europe, and were very strong in England. At the dissolution of the greater monasteries by Henry VIII. in 1539, no fewer than 60 of them were Augustinian. Only a

few houses of canons regular still remain, but of late years there has been a revival of the order in England.

**Augustow**, a tn. founded by Sigismund Augustus of Poland in 1557. It is about 120 m. N.E. of Warsaw, on a canal connecting the Vistula with the Niemen. It has some linen manufs., and great horse and cattle fairs are held in its spacious market place. During the First World War, in 1915, the S. wing of the Russian Army was here surrounded by the Gers, and forced to surrender. Pop. 10,000.

**Augustulus**, Romulus, the last of the nominal emperors of Rome. He was placed on the throne by the soldiery in A.D. 475 at the instigation of his father Orestes, but in 476 the Herulian chief Odoacer raised a revolt, slew Orestes, deposed A., and proclaimed himself king of Italy.

**Augustus**, a title borne by all the emperors of Rome from the time of Gaius Octavius, on whom it was conferred by the senate in 27 B.C. in recognition of the services which he had rendered to the state.

Gaius Octavius, b. in 63 B.C., was the grand-nephew of Gaius Julius Caesar, his mother being the daughter of Caesar's sister. He himself came on the paternal side from a family of good origin, but which had only recently acquired senatorial rank. In very early youth he lost his father, and passed on the next year under the control of a stepfather, L. Marcus Philippus. He advanced rapidly from rank to rank, in Rome, and in 45 B.C. he was made a patrician by the senate and Caesar's master of the horse for the next year. In the year 44 B.C. he was quietly studying at Apollonia when the news of Caesar's murder reached him. Almost immediately he crossed to Italy, to be greeted with the news that he had been adopted into the gens Julius, and had been appointed sole heir by the great dictator.

His claims as heir of Caesar were scornfully and lightly regarded by Marcus Antonius, Brutus, and Cassius, but nevertheless he soon began to gather round him a band of faithful followers, and he took part in the struggle which drove Antonius from Rome across the Alps. In the meantime Brutus and Cassius had dispersed to their provs., and in 43 B.C. Gaius Octavius, Antonius, and Lepidus formed a triumvirate. This triumvirate is marked by the huge proscription which took place under it. Their next move was to put down the power of Brutus and Cassius, who held, with the Republicans who had escaped the proscriptions, the E. portion of the empire, and in 42 B.C. at Philippi, Brutus and Cassius were defeated and killed themselves. Quarrels almost immediately broke out between the successful allies, but were soon patched up by means of the marriage of Antonius to Octavia, the sister of Gaius Octavius. Sextus Pompeius, who by his successes had forced the allies to grant him the is. of the W., was next attacked and routed, Octavius bearing the brunt of the battle

and being well supported by his life-long friend, Marcus Agrippa. Practically now the struggle for power lay between Antonius and Octavius. The years which elapsed between the decisive campaigns were spent by Octavius in reforms and reorganisation at home, an attempt to prove to the people that in him and him alone lay the safety and preservation of the sacred customs, institutions, and frontiers of Rome. His arms had been carried in triumph in Asia, Spain, Dalmatia, Pannonia, and Gaul. At home he had abolished the laws of the triumvirate, and had removed numerous abuses. Gradually every honour that Rome had to offer came into his hands. The tribunician power had been granted him for life, the office of pontifex maximus became his at the death of Lepidus, the form of gov. of the Rom. republic still remained, but gradually became nothing but a shadow. The question of succession was a difficult one. His brilliant stepson Drusus *d.* in 9 B.C., after proving himself a great general and a useful administrator. For the time he turned to his stepson Tiberius, but Tiberius was never a very lovable man, and soon he turned to his own blood relations and recognised his nephews, Gaius and Lucius, both of whom were raised to the consulship, as his heirs, but in A.D. 2, Lucius *d.* on his way to his command in Spain, and in the next year *d.* Gaius, returning wounded from Armenia. A. bowed to the inevitable, and Tiberius was recognised as heir, became a colleague of the princeps, and was adopted by him as a son.

The rumour of the founding of a Græco-Oriental empire, together with the discarding of Octavia by Antonius, roused the feeling of Rome and led to the decisive campaign. The great battle of Actium was fought in 31 B.C., and a year later Antony and Cleopatra *d.* by their own hands on the fall of Alexandria (30 B.C.). Octavius's next task was the reorganisation of the Rom. empire. The republic was restored, the power of the senate, the magistrates, and the assemblies was again given back. Into the hands of Octavius, however, was delivered the controlling authority, the gov. of the frontier, the command of army and navy, the control of the foreign affairs of the republic. In Jan., 27 B.C., the senate conferred upon him the title of Augustus the Venerable, the Majestic.

● The rest of this period of power is one long record of prosperity and victory, marred only by the defeat of the Rom. legions under Varus, A.D. 9, by Arminius. Tiberius, during the later years of A., was closely associated with him in the gov. of the empire. In A.D. 14, after a journey to Naples, A. *d.* at Nola on Aug. 19. The final act was his elevation to the number of the gods. During his period of power Rome had been practically rebuilt, he found it stone and he left it marble, while if we view A.'s reign from the point of view of literature, there are few, if any, periods, to which we can compare it. It was the original Augustan

age (*q.v.*) of literature—that of Horace, Virgil, Ovid, Tibullus, and Livy.

Augustus, the name of 3 electors of Saxony; 2 of them were also kings of Poland.

Augustus I.'s (1526–86) chief title to fame was his adoption of the Calvinistic form of religion and his later conversion to Lutheranism. When he became a Lutheran he violently persecuted the Calvinists. To him is due also the founding of the great library at Dresden.

Augustus II. (1670–1733), elector of Saxony and king of Poland. After the death of Sobieski in 1697 he became a candidate for the kingdom of Poland, which he succeeded in obtaining owing to the lack of opposition from France, whose claimant was the prince of Conti. A. now changed the hereditary religion of his family and became a Catholic. In alliance with Russia he fought Sweden in a vain attempt to win back the provinces which Sweden had previously conquered, and also in an equally vain attempt to make his elective power as despotic as his power in his hereditary dominions. He was defeated, and in 1704 deposed, Stanislas Leszczynski being elected in his place. After the battle of Poltava he marched into Poland with an army and regained the crown, which he kept until his death in 1733. He attempted to make his elective crown of Poland hereditary. His court was the most immoral in Europe, and of his numerous children only one was legitimate.

Augustus III., only legitimate son of A. II., elector of Saxony and king of Poland. On his accession the war of the Polish Succession broke out. The candidates were A. and Stanislas Leszczynski, the deposed king. By the help of Russia A. drove Stanislas out and became sole king in 1734. During the war of the Austrian Succession he was first against Maria Theresa, but ultimately on her side. He was defeated by Frederick the Great at the battle of Kesseldorf, and the treaty of Dresden was concluded. In 1756 he was driven from Saxony by Frederick the Great, whose aid found its own justification in the archives of Dresden. The treaty of Hubertsburg of 1763 restored Saxony to him. A. III. *d.* in the same year.

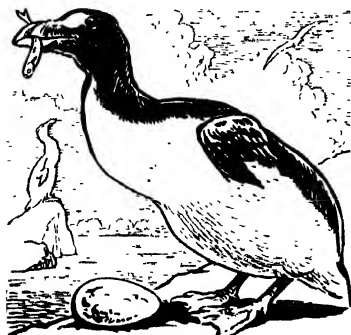
Aquila, see AUGILA.

Auk, a family of oceanic birds, scientifically known as the Alcedæ, belonging to the Charadriiformes, including the As. (*Alca*), the guillemots (*Uria*), and the puffins (*Fratercula*). They have short wings, webbed feet, heavy bodies; they feed on fish, and lay their solitary egg on a rock. *A. impennis*, the great A., formerly common in Spitzbergen, has been extinct since 1844; *A. lorda*, the razor-bill, most common in Labrador, is killed for its breast-feathers; *Fratercula arctica*, the puffin, is seen found the Brit. coast; *U. troile*, the guillemot, is common around the Brit. coasts. The great A. could not fly, but other As. use their wings for short distance flights and also as oars in the sea. See GARE-FOWL.

Auk, Black-billed, see RAZORBILL.

**Auk, Little, see ROTCHE.**

**Aulacodus** (Gk. *αυλας*, furrow, *ὄδους*, tooth), a genus of rodents of the family Octodontidae, found in S. Africa. It is a ground-rat, about the size of a cat, and is related to the porcupine and guinea-pig.



GREY AUK

**Aulapalai, see ALEPPI.**

**Aula Regis**, a royal court of justice estab. by William the Conqueror, and developed under his successors. It had depts. for hearing various kinds of pleas; from these descended the courts of king's bench, common pleas, and exchequer. See CURIA REGIS.

**Auld Lang Syne**, the name of a very familiar song by Robert Burns, written in 1789.

**'Auld Lights,' see PRESBYTERIANISM.**

**Aulic Council**, a legislative and executive body, estab. by the Ger. king Maximilian I. in 1497, to assist in governing the Holy Rom. Empire. At first its business was very wide, including every question, home or foreign, which might come before the emperor, but it was afterwards restricted to affairs of the empire only. The council consisted of about 20 members, of whom 6 were Protestants. There was much rivalry between the council and the imperial chamber, with which it had concurrent jurisdiction.

**Aulie-Ata**, 'holy father,' a tn. of Soviet Turkmenistan, in the Syr Daria basin; captured by Russia in 1861. Pop., mainly Kirghiz, 12,000.

**Aulis**, an anc. Boeotian seaport on the Euripus, famous as the starting place of the Gk. fleet for the Trojan war, also as the scene of the sacrifice of Iphigenia.

**Aullagas**, the name of a salt lake in Bolivia, which receives the surplus waters of Lake Titicaca through the Rio Desaguadero. As Lake A. has only 1 perceptible outlet, and that of inconsiderable dimensions, the destination and outlet of the surplus waters are unknown. Another name for Lake A. is Lake Poopo.

**Aulnoy, Marie Catherine, Baronne d'** (1650-1705), Fr. authoress. She wrote sev. romances now forgotten, and some lively but untrustworthy memoirs, but her *Contes des fées*, among which may be mentioned 'The Blue Bird' and 'The Yellow Dwarf,' have had a lasting success. She conspired against her husband, bringing a false accusation of treason; being detected she fled to Spain, but after some years was allowed to return in reward for secret services rendered to the gov. of Louis XIV.

**Aulophyte**, a plant, not a parasite, that shelters within another.

**Aulus Gellius**, a Lat. grammarian, b. in Africa between A.D. 125 and 130. At the age of 16 he came to Rome to study, and among his tutors were Apollinaris and Fronto. The work by which he is best known, *Noctes Atticae*, is a dialogue in which the most varied questions of grammar, philosophy, hist., and archaeology are discussed. It derives its title from the fact that it was composed at Athens and was written during the winter nights. Although the author's style is by no means free from affectations and obscurity, and the work as a whole is most pedantic in tone, it is nevertheless very valuable from the great number of references to personages and customs which are found therein. The first ed. appeared in 1469, and later ones are Eronovius, 1706; Hertz, 1903.

**Aumale**: 1. A manufacturing tn. of Normandy, on the Bresle; has cloth, steel, and glass works. Formerly called Albemarle or Aumerle; pop. 2500. 2. A Fr. military station in Algeria, on the site of an old Rom. settlement, about 80 m. from Algiers.

**Aumale, Counts and Dukes of**. The co. of A. in Normandy was granted by William the Conqueror to his brother-in-law, Odo of Champagne. Havoise, countess of A. in her own right, married firstly, William de Mandeville, earl of Essex (d. 1189), secondly, William de Fors (d. 1195), and thirdly, Baldwin de Behen (d. 1214). On the demise of Baldwin, count of A. by right of his wife, the co. was claimed by William de Fors, son of Havoise by her second marriage, and was confirmed in his possession by King John. But Normandy had in the meantime been conquered by Philip Augustus, and A. was taken by the Fr. Crown. The title of earl of A. (subsequently earl of Albemarle) was retained by William de Fors. A. was conferred on the son of Philip Augustus. After passing through many hands it came into the possession of Louis XIV., who gave it to the duke of Maine, and subsequently it came into the hands of the dukes of Orleans. The title of duke of A. has been borne by the sons of dukes of Orleans since the reign of Louis Philippe.

**Aumale, Charles de Lorraine, Duc d'**. A violent partisan of the Guises during the religious wars in France. A leader of the league and, together with the duke of Mayenne, leader of the Catholics on the death of Henry of Guise. Was defeated by Henry IV. at Ivry and other

battles. Refusing to surrender, he fled to the Spaniards, and betrayed sev. places into their hands. Was sentenced to death but escaped. *D.* in exile in Brussels in 1631.

*Aumale, Henri Eugène Philippe d'Orléans, Duc d'*, fifth son of Louis Philippe, king of France. Distinguished himself early as a soldier. Volunteered for service with the Fr. in 1870. Was refused, but subsequently became inspector-general of the army. Protested against the disfranchisement and exile of heads of families that had reigned in France. *D.* in 1897.

*Auncel*, a kind of balance or steelyard formerly used in England. It had a movable fulcrum and fixed weight, and the finger was often used as the fulcrum, which gave great opportunity for cheating.

*Aune*, or *Aulne*, an old European cloth measure, connected etymologically with Lat. *ulna*, elbow. It roughly corresponded to the Eng. ell, varying from 27 to 54 in. in different localities and periods. It is still used in Switzerland, where it measures 47½ in.

*Aungerville, Richard* (1281-1345), bishop, statesman, and author, was b. near Bury St. Edmunds, and hence known as Richard de Bury. Educated at Oxford, he became tutor to Prince Edward of Windsor, on whose accession as Edward III. he obtained rapid advancement, being sent sev. times on embassies to the pope (then at Avignon) and the Fr. court. In 1333 he became bishop of Durham, next treasurer, and then chancellor of the realm. He is best known to posterity as an ardent book-lover and collector; his authorship of the famous *Philobiblon* is, however, disputed.

*Aunis* was the name of an old prov. of France, between Saintonge, Poitou, and the Atlantic. It now, together with Saintonge, forms the modern dept. of Charente-Maritime.

*Aura*, in medicine, a term applied to the sensation of heat or cold, beginning in the extremities and creeping towards the head, which precedes an epileptic fit; also, to a creeping sensation sometimes accompanying gout.

*Aural Diseases*, see *EAR*.

*Aurangabad* is the name of 2 places in India. The more important is a walled tn., 67 m. N.E. by N. of Ahmednagar, and cap. of the prov. of A. It has the ruins of a palace built by Aurungzebe, and some noted caves, partly Buddhist. The trade is reviving. Pop. 40,000. A. is also the name of a vil. in the Bengal dist. of India, 40 m. W. of Gaya. Pop. 5000.

*Aurangzeb*, see *AURUNGZEBE*.

*Aurantaceae*, a sub-order of Rutaceae, which consists of trees and shrubs found exclusively in the temperate or tropical parts of the Old World. It contains the genus *Citrus* (q.v.), which includes lemons, oranges, and limes; *C. aurantium* is the sweet orange.

*Auray*, a Breton tn., in the dept. of Morbihan, 3 m. up the R. Auray. Famous for the ann. pilgrimage to its chapel of

Ste. Anne, called Le Pardon d'A. Besides having a market for agric. produce, it carries on fishing and boat-building, and has important oyster beds. Pop. 7000.

*Aure* is the name of a small Fr. riv. in Normandy, in the dept. of Calvados, which, after almost disappearing in the marshes to the N.W. of Bayeux, flows to the mouth of the Vire.

*Aurelian Wall*, a fortified wall surrounding anct. Rome, mainly built by the Emperor A. in A.D. 271 and completed by Probus in 280. Its circuit of about 13 m. can still be traced, and much is in an excellent state of preservation. The wall had an average height of 50-60 ft. and a width of 12 ft. It was constructed of concrete, with brick facing, with square towers at intervals of 45 ft., and was pierced by 14 gates.

*Aurelian Way*, an anct. road of Italy, which ran from the Janiculan gate at Rome northwards along the coast, through Civita Vecchia, Pisa, and Genoa to Antipolis (Antibes) in Gallia.

*Aurelianus, Caelius*, a physician who lived at Sicca, in Numidia, probably about the fifth century; he left some valuable translations of anct. medical treatises.

*Aurelianus, Lucius Domitius*, Rom. emperor. Born in Pannonia c. A.D. 214 of obscure family, he became a soldier and by his valour and capacity rose to the highest military rank. On the death of Claudius II. he was proclaimed emperor by the army. His reign, which lasted 5 years, was largely occupied with foreign wars, the most noted being that against Queen Zenobia, but he also found time for internal reforms. He was treacherously murdered by his own officers, A.D. 275.

*Aurelius Antoninus, Marcus* (A.D. 121-180); his original name was Marcus Annus Verus. His mother, Lucilla, was of consular rank, while his father had been raised to the rank of patrician by the Emperor Vespasian. The young Marcus was adopted by his grandfather on the death of his father, and his early moral training must have been exceedingly good—in fact, well-nigh perfect. He early attracted the attention of the Emperor Hadrian, by whom his uncle (Antoninus Pius) had been adopted on condition that he in turn adopted Marcus and Lucius Commodus, the son of the heir designate of Hadrian, who had d. In 139 the title of Caesar was bestowed upon him, and in the following year he became a consul. He himself, in his *Meditations*, says, 'To the gods I am indebted for having good grandfathers, good parents, a good sister, good teachers, good associates, good kinsmen and friends, nearly everything good.' His education left nothing to be desired; he was brought up under the careful training of tutors, one of whom was Herodes Atticus (q.v.). At the early age of 11 he fell under the influence of the Stoic philosopher and painter Diogenetus, and finally abandoned the rest of his studies for philosophy and law. He adhered strictly to the tenets of the Stoic philosophy, and learned to



work hard, to avoid slander, to endure misfortunes, and never to depart from his set purpose.

On the death of Antoninus Pius in 161, he became emperor, but although the name of Verus was not mentioned, he himself admitted Verus as his partner, and bestowed upon him full powers. Verus, who led a loose and licentious life, had one virtue which probably overshadowed his vices, that of respect and deference to the judgments of Marcus Antoninus. The opening of his reign was far from propitious. At home an overflowing of the Tiber wrought disaster, in Britain the Rom. legions were in revolt to make their general emperor, in Cappadocia the Parthians annihilated some of the Rom. forces. Verus, sent to oppose the Armenians, failed hopelessly, and although the Armenian war was brought to an end, the Armenian army of Verus brought with it back to Rome a terrible disease. Many of the Romans thought that the last days of empire had come, but through it all Marcus never abandoned hope, and always remembered the Stoic command never to give up that on which he had set his mind. In 169 Verus died, and Marcus became the sole master of the Rom. empire. His work now concerned every dept. of empire. The economic reforms that were necessary, the social problems which Rome had to face, necessitated the constant attention of the emperor, and this attention never failed. His time was fully occupied, and yet, in spite of poor health, he managed to work from early morning until late at night, and seem no worse for it.

In 169 he set out to quell a rising which had broken out with the Ger. tribes in Pannonia, and for the next few years his time was constantly taken up with this, until in 174 he won the victory which gave rise to the fable of the 'Thundering Legion.' In Germany he received the news of the revolt of Avidius Cassius, who had proclaimed himself emperor. At the end of 3 months Avidius Cassius was dead, his head had been brought to Marcus Antoninus, his family pardoned at the request of the emperor, and the rising quelled, largely owing to his unexpected clemency. In the meantime his wife, Faustina, had *d.* After the death of his wife A. returned to Rome, visiting Athens on the way, and enjoying in Rome a triumph for his Ger. victories. In the following year (177) he returned to take the field against the Gers., and *d.* probably at Vienna in Mar. of that year. The accounts of his death differ, but the probability is that he *d.* of acute stomachic trouble. His son Commodus was with him when he *d.*, and erected to his honour the Antonine column. A. was, of course, deified, and became recognised as one of the household gods of Rome.

In 176 had occurred a persecution of the Christians for which A. has been attacked. Christianity was to Marcus A. simply heresy, and, as heresy, was to be punished. It will be noted that he never

directly ordered the persecution of the Christians, but only the persecution of heretics. A. did not understand Christianity, but only considered it as a damper to Rome and Rom. ideals. A. was the author of the *Meditations*, which contain the ideals of his philosophy. A large number of scholars have tried their hands at translating A. The task is no doubt unusually difficult, because the text abounds in Stoic technical terms to which there are no exact modern equivalents; while the underlying psychology of the Stoics was very different from ours,



MARCUS AURELIUS  
National Museum, Naples.

being too much based on the rational and conscious, though in some respects it anticipated some of our recent discoveries. See *The Meditations of the Emperor Marcus Antoninus*, ed. with translation and commentary by A. S. L. Farquharson (2 vols.), 1945.

Aurelius, Victor Sextus, Rom. historian, lived in middle of the fourth century, was a favourite of the Emperor Constantius. He wrote hist. of Rome before and after Augustus. Another historian of the same name continued his hist. of the emperors a century later.

Aureole, a shining cloud surrounding the representation of sacred personages in Christian art. Originally confined to divine figures only, but afterwards more widely used. The A. surrounds the whole figure; a luminous ring round the head only is called a nimbus; this is also found in anct. pagan art, and is probably of mythological origin.

Aures Mts., in S. Algeria, one of the Atlas ranges; highest peak, Shelliya, 7760 ft.

Deep snow lies on the A. in winter. There are many fertile valleys and 1 considerable plain, the Medina. The river mostly flows S.; some are absorbed by irrigation, others fertile oases in the Sahara. Their largest basins are called shotts. The dist. was under Rom. rule, and its people, mostly Berbers, are of very mixed descent, showing frequent traces of fair, probably Gaulish or Vandal, ancestry. The A. were occupied in 1845 by the Fr., whose chief settlement, Batua, is near the great Rom. ruins of Lambæsis.

**Aureus.** The stater aureus of anct. Greece equalled 25 Attic drachmæ of silver, about £1 Eng. The first Rom. aureus, of pure gold, was struck about the close of the war with Hannibal, and was copied from Gk. models. It was worth about 16s. Eng. It did not become a standard coin until the time of Julius Cæsar. Later emperors debased its value.

**Aurich.** a tn. of Hanover, cap. of E. Friesland, on the Ems-Jade canal. 18 m. from Emden. It has breweries and paper manufactories. Its old palace has been turned into gov. offices. Pop. 6000.

**Aurichalotte** (Lat. *aurum*, gold; Gk. χαλκός, copper), an amorphous, green, transparent mineral formed of hydro-carbonate of copper.

**Auricle:** 1. The flap of the ear, with the auditory tube. See EAR. 2. The name given to 2 cavities in the heart, leading to the ventricles. See HEART.

**Auricula** (*Primula auricula*) is a plant of the order Primulacæ. It grows abundantly on the Swiss Alps, and has many florists' varieties.

**Auricula** (Lat. *dimin. of auris*, ear), a genus of univalve-shelled molluscs, which inhabit marshes and their borders. The animals are snails of the Pulmonata and family Auriculidæ; they are found in the warmer climates, where they feed on plants. Fossil Auriculæ are found in the Jurassic system, and the shells are long and spiral. *A. midæ*, or Midas's ear, is found in the E. Indies.

**Auricular Confession,** see CONFESSION.

**Auriculate**, a term used in botany to describe the state of a certain kind of leaf. It possesses no petiole, or leaf-stalk, and consequently is fixed directly to the stem. The vagina, or leaf-base, which is continuous with the blade, is winged, and its 2 lobes project on either side of the stem.

**Auriga** (Lat., the Charioteer), a constellation situated between Perseus and Gemini. It is represented as a man holding a bridle in his right hand and supporting a goat and kids on the left arm. Alpha Aurigæ, in the body of the goat, called Capella (and Alloth by the Arabs) is brighter than the first magnitude, and by it the constellation is most easily found. The neighbouring constellations on either side are Perseus and Taurus, and the prin. stars are never below the horizon in the Brit. Isles. The mythology of the figure is uncertain, being attributed by some to the Horus of the Egyptians, whilst others accord it a

Euphratean origin. Capella is the fifth brightest star in the heavens, its magnitude being 0.2. Its proper motion has been calculated as 44" a century. The spectrum of Capella is full of metallic lines showing a composition similar to the sun. In 1900, at the Lick Observatory, Prof. Campbell, and at Cambridge, Prof. Newall, found that Capella consists of 2 stars which revolve about one another in a period of 104 days. A new star, Nova Aurigæ, discovered with the naked eye by Dr. Anderson in 1891, then of a magnitude 4.4 and still visible to powerful telescopes, is one from which we have learned much about the various novæ, or new stars.

**Aurigny**, the old Fr. name for Alderney, the northernmost of the Channel Is.; Macaulay uses it in his poem on the Armada.

**Aurillac**, cap. of the dept. of Cantal, in central France, on the R. Jordanne. Its abbey was founded in the ninth century, and became one of the greatest monastic schools of France. Pope Sylvester II. was b. at A. The present abbey dates from the seventeenth century. A. is a prosperous commercial tn. Pop. 16,000.

**Auriol**, a manufacturing tn. with a coal-mine, in the Fr. dept. of Bouches-du-Rhône, 15 m. E.N.E. of Marseilles. Pop. under 3000.

**Aurispa, Giovanni** (1370-1459), It. scholar of the Renaissance, patronised by Cosmo de' Medici and Pope Eugenius IV. He visited Constantinople and brought away valuable MSS.

**Aurlandsfjord**, a branch of the Sogne Fjord (q.v.), on W. coast of Norway, being a winding inlet running to the S. of the main fjord.

**Aurochs**, the anct. wild ox of Europe, and a descendant of the gigantic cattle of the Pleistocene period. It was known in the Middle Ages, but is now extinct.

**Aurora**, the Rom. goddess of the dawn, corresponding to the Gk. Eos.

**Aurora:** 1. A city of Kane co., Illinois, U.S.A., first settled in 1834; an important centre, with large railway works, iron foundries, flour and cotton mills. Pop. 48,000. 2. A tn. of Lawrence co., Missouri, U.S.A., near a lead and zinc mining region; manufs. iron goods. Pop. 3500. 3. A popular vil. summer resort in Cayuga co., New York. Seat of the Wells College.

**Aurora Borealis**, a phenomenon seen at night-time in N. lats. It takes the form of beams of many coloured lights quivering in the sky. It is to be observed in the N. of Norway and in corresponding lats. The phenomenon is believed to be due to emanations of an electro-magnetic nature from the sun. See further under LIGHTS, NORTHERN.

**Aurungzebe, or Aurangzeb** (1618-1707), third son of Shah Jehan, a Mogul emperor of Hindustan. At an early age he showed great military talent, and was entrusted by his father with the command of sev. expeditions. Shah Jehan being taken seriously ill, his eldest son, Dara, seized the throne, but by a series of crafty negotiations and manoeuvres,

**A.** made himself master, shut up Shah Jehan in prison, slaughtered his brothers, and so became sole ruler. His reign of 49 years, 1658-1707, was the most brilliant period of the Mogul dynasty, but his despotic gov., and especially his Mohammedan bigotry, excited intense opposition, and the latter part of his reign was greatly troubled by the princes of Rajputana and the Mahrattas under Sivaji.

**Ausable Chasm**, a deep gorge 2 m. long, near A. Riv., New York, noted for its beautiful scenery.

**Auschwitz (Oswiecim).** The Ger. commandant of the A. concentration camp, Rudolf Franz Hoess, was tried and executed in Warsaw in 1947 for the murder of 4,000,000 persons in this admittedly the worst of all Ger. death-camps. Hoess was a man aged 47, father of 5 children, with a fair, characteristic countenance and the mild demeanour of a clerk. Against all the testimony of State witnesses, 48 of whom were Polish and 18 foreigners, as to his personal participation in sadistic methods of execution, his defence was that he was merely carrying out the orders of Himmler (q.v.). He was originally a farmer, joined the Nazi party at the outset, and became a personal friend of Himmler. When the A. camp was being built in 1941 he was informed of Hitler's decision to liquidate the Jews there, that he was to be the commandant, and that between 6,000,000 and 7,000,000 Jews were to be annihilated, the majority at A. The figure Hoess gave for those executed by gas was 1,500,000, all Jews, but he admitted under cross-examination that on one night train-loads of Jews and gipsies were taken on arrival and thrown into an immense pit and there burnt alive. Witnesses said the number so put to death was 40,000. Such evidence of horrors continued to be given at the trial day by day. It confirmed in pitiless detail the evidence on A. given at the Belsen trials, of acts against humanity unparalleled in this or any other age. The trial was scrupulously conducted, and the court was specially constituted, consisting of the presiding judge, 4 assistant judges, and 4 members of the Polish Seym or Diet. Neither in this nor in any other Polish trials of terrorists did the ideological element play any part; though naturally such trials were utilised politically to show the risk of opposition to the new Gov. or to the fundamentals of the new Polish State. It was emphasised at the trial by the public prosecutor that Hoess was a willing link in the system aiming at the total destruction of the Slav people, a system which, it was averred, began 1000 years ago when the Poles were driven from the Oder and Neisse; while in the twentieth century it employed the most scientific methods of destruction with the object of wiping out the entire Polish nation. This was the theme most elaborated in court to serve definite political ends by constantly reasserting the ever-present menace of Germany and the fact that those who wanted to rebuild Germany could never be friends of Poland.

**Ausgleich**, the name of a treaty which governed the fiscal, financial, and commercial relations between Austria and Hungary, first concluded in 1867, and renewed in 1878, 1887, 1902, and 1907. Its chief function was the regulation of the amount contributed by each towards the imperial exchequer, and the proportional div. of the national debt.

**Ausonians**, the name by which Virgil in the *Aeneid* designates the Itals. as though they were named after Auson, son of Ulysses. It is also used by Milton.

**Ausonius, Decimus Magnus** (A.D. 310-c. 390), a Lat. poet, son of a physician of Burdigala (Bordeaux), where he received his education. He first became an advocate, but afterwards a prof. of grammar and rhetoric. He was so successful that the Emperor Valentinian invited him to Rome to be the tutor of his son Gratian. When the latter came to the throne he bestowed high rewards on his teacher, giving him the prefectures of Gaul and Italy, and afterwards the consulship. At the death of Gratian, A.D. 383, A. retired to Burdigala. His contemporary reputation seems hardly justified by his works; he was rather a versemaker than a poet, and his writings are marred by licentiousness.

**Auspices**, see AUGUR.

**Aussee**, a small tn. on the R. Traun, in the N.W. corner of Styria, Austria. Has beautiful Alpine scenery and saline springs; favourite health resort. Pop. 1500.

**Aussig (Usti)**, tn. and river-port of Bohemia, on the Elbe, is also an important railway centre; manufs. (1939) chemicals, glass, and textiles, and trades largely in coal, stone, and timber from the surrounding dist. Suffered much during Thirty Years war and Seven Years war. Pop. 43,900.

**Aust-Agder**, a S. co. of Norway, bordering the Skagerrak. Area, 3606 sq. m. Pop. 74,700.

**Aust Cliff** is the name of a famous bone-bed in Gloucestershire, the deposits of which are usually classed with the Lias formation. A few organic remains have also been found there which appear to belong to the Keuper deposits. This has been thought sufficient evidence for removing them from the Lias classification, but the mineralogical and geological relations of the bed render this course unjustifiable.

**Austen, Charles John** (1779-1852), younger brother of Jane A., Brit. rear-admiral (1814). Assisted in the capture of the *Komel*, the *Tribune*, the *Ville de l'Orient*, and the *Scipion*; was wrecked in the *Phoenix* (1816); commanded the *Aurora* in the W. Indies (1826-28), being engaged in suppressing the slave trade; assisted at the bombardment of St. Jean d'Acre (1840).

**Austen, Sir Francis William** (1774-1865), elder brother of Jane A., the novelist, entered the Royal Naval Academy in 1786. Two years later he joined the *Perseverance* brig, thus commencing a long and honourable career. During the great Fr. war he was in constant

service, attained post rank in 1801, and was flag-captain on the *Canopus* in 1805. In 1809, for distinguished service in the E. Indies, he was presented by the E. India Company with £1000. From 1810 to 1814 he served chiefly in the North Sea and Baltic. Was made K.C.B. in 1837, and admiral of the fleet in 1863.

Austen, Jane (1775-1817), one of the most famous of Eng. novelists. Her father was rector of Steventon, near Basingstoke, in Hampshire. She was the youngest of 7 children, only 1 other of whom was a girl. Two of her brothers were afterwards admirals. In person she was very attractive, tall and graceful. She was educated by her father, and had the advantage of a far superior education to most girls of her day.

From childhood she wrote stories, and one of her chief amusements was to tell long impromptu tales to children. For the first 25 years of her life she lived at Steventon. In 1801 she went with her family to Bath, and to Southampton in 1805. After the death of her father 3 years later she moved to Chawton, a vil. near Winchester, and it was from this place that her first novels were issued. The first one, *Sense and Sensibility*, was pub. in 1811 (written in its present form in 1797-98), which was followed by *Pride and Prejudice* in 1813 (actually written in 1796-97). The next year she pub. *Mansfield Park*, and 2 years later *Emma*. Early in the next year her health began to decline, and to be nearer proper medical treatment she went to live at Winchester. It was found that she was suffering from severe consumption, and her friends were grieved to hear that it was but a question of months till the end. *Northanger Abbey* (written in 1798) and *Persuasion* were pub. in 1818, the year following her death. *Lady Susan*, *The Watsons*, and other fragments were first pub. in the second ed. of J. E. Austen-Leigh's *Memoir*, 1871.

She may be said to have been the founder of the domestic novel, and all her characters were drawn from those with whom she came in daily contact. She is strong in the delineation of character, especially of persons of her own sex, through delicate touches arising out of everyday incidents in the life of the middle and upper classes. Her characters, though of ordinary types, are drawn with such firmness and precision that they retain their individuality intact through their entire development and they are never coloured by her own personality.

Her fine work met with the approval of such critics as Sir Walter Scott, Lord Macaulay, Southey, and Coleridge. In the diary of the first-named he wrote of J. A.: "That young lady had a talent for describing the involvements, feelings, and characters of ordinary life which is to me the most wonderful I have ever met with." Lord Macaulay went so far as to say that she was nearly equal to Shakespeare in the delineation of characters, and once said of her work

that 'There are in the world no compositions which approach so near to perfection.' And such unstinted praise from such men is an honour which falls to the lot of few authors, and when one thinks that her best work was done when she was a girl of 22, her greatness can best be appreciated. A collection of the juvenilia of J. A., recently discovered in MS., was pub. in 1933 under the title *Volume the First*.

BIBLIOGRAPHY: *A Memoir of Jane Austen*, by her nephew, J. E. Austen-Leigh, 1871; Lord Brabourne, *Letters of Jane Austen*, 1884; C. Hill, *Jane Austen—her Homes and her Friends*, 1901; G. E. Mitton, *Jane Austen and her Times*, 1905; F. W. Cornish, *Jane Austen*, 1913; Léonie Villard, *Jane Austen, a French Appreciation*, 1924; R. Brimley Johnson, *Jane Austen*, 1930; M. Wilson, *Jane Austen and some Contemporaries*, 1938.

Auster, in Rom. literature, the S. or S.W. wind; referred to by Virgil in his second eclogue, l. 58.

Austerlitz, a small tn. in Moravia, near Brno and about 80 m. N.E. of Vienna. On Dec. 2, 1805, Napoleon here won a decisive victory against the Russian and Austrian armies, capturing 15,000 prisoners and 133 guns. A few weeks later Austria concluded the peace of Pressburg.

Austin: 1. Cap. of Texas, and co. seat of Travers co., U.S.A., on the Colorado. First built and named Waterloo by Amer. settlers in 1838, Texas being then Amer. ter. In the next year the Texans proclaimed their independence, and chose Waterloo as their cap., renaming it A. in honour of one of their leaders. It is now a city with large trade and manufs., a fine capitol, and a univ. Pop. 88,000. 2. A tn. in Minnesota, U.S.A., has meat-packing establishments, furniture manufs., etc. Pop. 18,300.

Austin, St., see AUGUSTINE.

Austin, Alfred (1835-1913), poet laureate, the son of a Leeds merchant, was b. at Headingley. He was educated at Stonyhurst, Oscott, and London Univ., graduating in 1853. He became a barrister in 1857; but within a few years turned to literature, making his first success in 1861 with a lively satirical poem, *The Season*; this being strongly attacked, he retorted with another satire on his assailants. He pub. many works in prose and verse, including tragedies (*Savonarola*, 1881, and *Flodden Field*, 1903), lyrics, poems on historical persons and events, and above all, poetry and prose descriptive of nature, the latter subject being perhaps most congenial to his muse. One of his best-known books is *The Garden that I Love*, 1894-1907, a prose idyll. A. had a considerable place in journalism as a leader-writer and correspondent, and was for some years editor of the *National Review*. At the death of Tennyson in 1892 every one recognised that the 2 greatest surviving poets were both 'impossible' for the laureateship; and the selection, which aroused much controversy, was left in abeyance until 1896, when A. was appointed. See A.'s *Autobiography*, 1911.

**Austin, Horatio Thomas** (1801-65), Eng. navigator and explorer, served under Parry in 1824 in his fruitless attempt to find the N.W. Passage. He distinguished himself in the Egyptian expedition of 1840. In 1850 he was appointed to the command of an expedition sent in search of Franklin.

**Austin, John** (1790-1859), the celebrated writer and authority on jurisprudence; after a short career in the army, during part of which he served in Sicily, was called to the bar in 1818. His success as a barrister was indifferent, and in 1825, his health giving way, he retired from legal practice. In 1826 he was appointed prof. of jurisprudence in the newly founded univ. of London, where he had as hearers such distinguished men as John Stuart Mill, Sir G. C. Lewis, and Lord Romilly. The success of the lectures, however, was not maintained, and in 1832 lack of students induced A. to resign the chair. In 1833 he was appointed a member of the commission on the reform of the criminal law, and in 1836 a member of the Maltese commission. On the letter of these he distinguished himself considerably. The 10 years following he spent on the Continent, returning to England in 1848 in consequence of the revolutionary disturbances. A.'s lectures and writings on jurisprudence are distinguished by originality and power of expression, and have exercised great influence in modern conceptions of the subject. The philosophical value of his work has been disputed, but in his *Province of Jurisprudence Determined*, pub. in 1832, and treating of the relation between law and ethics, his doctrine of utilitarianism is admirably presented. His *Lectures on Jurisprudence* or *The Philosophy of Positive Law*, was ed. and pub. after his death by his wife, Mrs. Sarah A. (see below). His collected writings have been pub. under the editorship of his son-in-law, Mr. Robert Campbell, and in this form have gone through sev. eds. See Preface by his wife to *The Province of Jurisprudence*, 1861, and the interesting account by John Stuart Mill in his *Dissertations*. Mrs. Sarah A., wife of the above, pub. sev. translations from the Fr. and Ger., including Guizot's *English Revolution*, 1850; Ranke's *Popes*, 1840, and Ranke's *History of the Reformation in Germany*. She was also the author of *Germany from 1760 to 1814* (1854), and *Letters on Girls' Schools and on the Training of Working Women*, 1857. She d. in 1867, at the age of 74.

**Austin, Stephen Fuller** (1790-1836), founder of the state of Texas, was the son of one of the early settlers in the dist. In 1821 he founded the settlement which is now the city of A. In 1834, in consequence of his attempts to secure the recognition of Texas as a separate state of the Mexican Confederacy, he was imprisoned for some months in Mexico city.

**Austin, William** (1587-1634), religious writer and lawyer, was the author of *Devotionis Augustinianæ Flamma* or *Certaines Devout, Godly, and Learned*

*Meditations* (1635; new ed. 1637), and *Hæc Homo, wherein the Excellency of the Creation of Woman is described by way of an Essay*, 1637. He also trans. Cicero's *Cato Major* or *the Book of Old Age*.

**Austin Friars**, the name of a well-known monastery of the Augustinian order, at one time situated in Broad Street, London. It was founded in 1253 by the Earl of Hereford.

**Austral**, see TUBUAI.

**Australasia** (S. Asia). This term is sometimes used as the equivalent of Oceania, and as such indicates Australia with the neighbouring is.—Tasmania, New Zealand, New Guinea, the New Hebrides, New Caledonia—the Malay Archipelago, the Philippines, and the other is. of the Pacific. Geographically it is most frequently used to denote Australia with Tasmania, New Guinea, New Zealand, New Caledonia, and the Solomon, Bismaruk, and New Hebrides groups. It is also popularly used to signify the Brit. Australian possessions.

**Australia**, the one continent lying wholly in the S. hemisphere. Its position is between 10° 4' and 39° 8' S., and between 113° 8' and 153° 39' E. Its dimensions are 2400 m. from E. to W., and 1971 m. from N. to S. Approximately the area is 2,974,581 sq. m. Its nearest distance to England is about 11,000 m. Its coast-line is 8850 m.

**Physical**.—The whole continent of A. is, roughly speaking, a vast, irregular, and undulating plateau, part of which is below sea level, surrounded by a mountainous coast-line, with many intervals of low sandy shore in the N.W. and S. The noticeable features of the continent of A. are: (1) its comparatively smooth outline; (2) its poverty of water communication with the interior; (3) the absence of active volcanoes and snow-topped mts.; and (4) its antiquity. In the question of age, A. claims to be one of the oldest existing land masses. Its boundaries are, on the N. the Timor Sea, the Arafura Sea, and Torres Strait; on the E. the Pacific Ocean; on the S. the Bass Strait and the S. Ocean; and on the W. the Indian Ocean. The land surface stands at the top of a series of 3 terraces which rise from the ocean bed. In the Pacific the base of these foundations lies at a depth of 15,000 ft. below the sea level. The next layer has a depth of 8000 ft. Where this terrace approaches the coast it becomes a continental shelf, and by it are connected A., New Guinea, and Tasmania. The continental shelf of A. is comparatively narrow, while at some points on the E. the coast descends sharply to the deepest part of the ocean bed, providing a phenomenon rarely met with elsewhere. The Great Barrier Reef forms the edge of this shelf as it rounds the Queensland coast. Compared with other continents A. attains a mean altitude lower than them all. Generally the whole continent may be called a plateau whose interior is depressed and barren. The E. half of the continent is occupied by a plain 500,000 sq. m. in extent.

The Australian coasts are singularly free from inlets of the sea, save for those of the N. coast. Here the gulf of Carpentaria forms the chief bay of the entire coast. To the W. of this is Van Diemen's Gulf, of less extent but greater advantage, for it is protected from the violence of the sea by Melville Is. Beyond are Queen's Channel and Cambridge Is. Indentations are more frequent on the N.W. and include Admiralty Gulf, Collier Bay, and King Sound. The only bays on the coast of W. A. are Exmouth Gulf and Shark's Bay. This scarcity is characteristic of the rest of the coast, the exceptions being Spencer Gulf, Gulf of St. Vincent, and Port Phillip on the S., and Moreton Bay, Hervey Bay, and Broad Sound on the E. Those harbours spacious enough to mention are noted under the various states in which they are situated. The most interesting and most prominent feature of the Australian coasts is the Great Barrier Reef. Of all coral reefs it is the greatest, its length being 1200 m. The openings that break its continuity are found opposite the riv. mouths, and a theory is advanced that the gaps have been worn by the fresh water thus reaching the reef. A more reliable cause, however, is that of subsidence, as the distance from the mainland of the breaks is from 30 to 90 m. Tasmania is the only important is. belonging to A., those of New Guinea, Timor, etc., belonging to other systems. Off the W. coast are numberless small is., but none of any commercial significance. On the E. are a few, but again relatively unimportant is., while in Bass Strait are the Flinders and the Clarke Is., and others of small size and less importance. At the entrance of St. Vincent Gulf is Kangaroo Is., one of the largest is. of the Australian coast. On the N. are Melville and Bathurst Isles, while in the gulf of Carpentaria, among numerous small ones, is Groote Eylandt. The mts. of A. may be classed into the E. Cordillera group, the central mts., and those of the W. With the E. Cordillera are comprised the Great Dividing Range, running parallel with the E. shore, and its spur the Bellenden Ker Range, in Queensland; the New England and Liverpool Ranges and Blue Mts., in New S. Wales; and the Australian Alps, Pyrenees, and Grampians, in Victoria. The central mts. are the Lofly Flinders and the Gawler in the S.; the Macdonnell and Musgrave in the centre; and those of Murchison and Ashburton in the N. The W. mts. include the ranges of the Darling, Roe, and Stirling in the S.W., and King Leopold Range in the N. The highest point of the continent is Mt. Kosciuszko, 7327 ft., in the Australian Alps, New S. Wales. Others which are among the most prominent are: Mt. Townshend, 7266 ft., and Mt. Twynnam, 7200 ft., also in New S. Wales; Mt. William, 3827 ft., in the Grampians (Victoria), with Boyong, 6508 ft., Featherston, 6303 ft., and Hotnam, 6100 ft. in the Australian Alps. Mt. Sea View, 6000 ft., and Ben Lomond, 5000 ft. in New S. Wales; Woorenooran, 5400 ft., Sophia and Dalrymple, both

4200 ft., in Queensland; Mt. Remarkable and Mt. Brown, each 3100 ft., and Mt. Lofly in S. A.; Mt. Barrett and Mt. William, 3000 ft., Kegenepur, 3500 ft., and Ellen's Peak, 3420 ft., in W. A.; Cradle Mt., 5000 ft., in Tasmania.

It is only within recent times, geologically speaking, that volcanic absence has been a characteristic of A. On some of the mts. in W. Victoria the cones are quite intact and beds of scoriae have not yet been affected by denudation. Towards the Tertiary Age, large beds of lava have been poured from sev. points of the Great Dividing Range, and it is worthy of note that volcanic action was confined to a wide region parallel to the coast. A peculiar phenomenon in A., in a spur of the Liverpool Range, is that of Mt. Wingen. Though not a volcano, it fulfils the erroneous description sometimes applied to one. It is, in fact, a 'burning mountain.' Its state of chronic combustion is caused by the burning of coal underground, resulting in a lavish expulsion of smoke and steam. It has been estimated that this combustion has been active for 800 years.

The coastal region, save for the country round the Bight and Spencer Gulf, is well watered. In the E. coast, flowing into the Pacific Ocean, are many large rivs., but the majority have short and rapid courses. Of the Queensland rivs. the finest is Burdekin. It drains an area of 53,500 sq. m. and empties itself into Upstart Bay. The numerous tribs. feeding it help to carry a large amount of fresh water even in the driest season. Second in size is the Fitzroy, flowing into Keppel Bay. The Brisbane R. empties into Moreton Bay, and owes its importance to the tn. of Brisbane on its banks. There are sev. important rivs. in New S. Wales, of which the largest is the Hunter, whose course is 200 m. In order of position, from N. to S. the others are: Richmond, Clarence, Macleay, Hastings, Manning (Hunter), Hawkesbury, and Shoalhaven. The Snowy R. has its mouth in Victoria, though the large part of its course is in New S. Wales. Other rivs. worthy of mention are the Yarra, entering the sea at Port Phillip, the Hopkins, and Glenelg. The Murray, 1520 m. in length, is the largest, although it is not the longest, riv. of A.; it passes through Lake Alexandrina, thence into the sea at Encounter Bay, in S. A.; its chief tribs. are the Murrumbidgee, Lachlan, and Darling. The only other rivs. in S. A. are the Torrens and Gawler, neither of which is of much importance. In the S.W. the Swan is of some importance, at whose mouth Perth, the cap. of W. A., is situated. The prin. rivs. between the Swan and the N.W. Cape are Greenough, Murchison, and Gascoyne; on the N.W. coast Ashburton, Fortescue, and De Grey, and in the Kimberley dist. the Fitzroy, Panton, Prince Regent, and Ord. There are sev. navigable rivs. in the N. ter. The Victoria is navigable for about 40 m. for large vessels, and 120 for small. The Fitzmaurice, a large stream, discharges itself into the estuary of the

Victoria. The Daly, in its upper course the Katherine, is navigable for some considerable distance; the Adelaide is navigable for about 40 m.; the S. Alligator is navigable for over 30 m. and flows into Van Diemen's Gulf. Other smaller rivers have their mouths on the N. coast, while on the W. of the gulf of Carpentaria is the mouth of the Roper, a large river navigable for 80 m. by the largest vessels. Amongst the rivers that discharge their waters from the coast of Queensland into the gulf of Carpentaria are the Norman, Flinders, Leichhardt, Albert, and Gregory on the S. shore, and Batavia, Archer Coleman, Mitchell, Staaten, and Gilbert on the E. Those rivers draining the country round the gulf of Carpentaria are sub-tropical in character. The Darling, one of the longest rivers of the world, is navigable for small steamers in time of freshets as far as Walgett, 1758 m. above its junction with the Murray.

A noteworthy feature of the interior is the lake region. The extent of the lakes varies with the advent and retirement of the rainy seasons. Their waters are brackish, and during the dry season nothing is seen but salt-encrusted marshes. The largest of the series is Lake Torrens, with a length during flood of 100 m.

Central A. is prolific in its store of subterranean water. In 1880 the first well was bored in the W. of New S. Wales. Two years later it was concluded that a deep artesian basin lay in the W. of Queensland. At 1645 ft. below the surface water was reached, and 291,000 gallons a day was discharged. This was the first of the artesian wells. The deepest well is that of Whitewood, 5046 ft. deep. The water is forced to the surface by hydrostatic pressure of accumulated water at a higher level.

The climate of A. would be expected to vary considerably, owing to its great size. This, however, is less the case than in other continents. Its distance from the Antarctic circle and the equator, and enormous absorption of heat by day causing its radiation by night, in the great plains, form powerful factors in determining the uniformity of the climatic conditions. The fierce heat of the day causes two-fifths of the surface of A. to receive less than 10 in. of rain throughout the year. Whatever vapour masses are formed remain in that condition owing to the absence of any condensing medium. But the remainder of the continent may be said to enjoy a fairly good supply. The N.W. coast is subject to a tropical downpour from Dec. to Mar., while the remaining coasts enjoy a mean rainfall of 50 in. in the E., much less in the S., being on an average 24 in., while part of the S. and W. coasts attain only 10 in. to 20 in. The visitations of drought prove ruinous to many farmers and cattle-breeders, and this feature of uncertainty of rainfall constitutes a never entirely absent menace to colonists. In 1884 a drought destroyed 10,000,000 sheep, and all the rivers, with the exception of the Murray proper shrunk to insignificance. Again, the return of the

season, coming with its tempestuous floods, causes an almost equal destruction of life and property by means of the floods which the swollen rivers bring about. All that can be done in the matter of irrigation to lessen the unreliability is in operation, and irrigation colonies are in existence on the Murray. The scarcity of the natural water supply has been mitigated to some extent by borings and by the construction of dams on a large scale. The largest reservoir is the Hume dam, on the Murray near Albury. It has 2½ times the area of Sydney harbour, and



Australian Government  
RIBBON OR MANNA GUM (*E. viminalis*)

The ribbons of bark that hang from the trunks are often 15-20 ft. long.

may still be increased in size. The further conservation of great volumes of water, which would otherwise run to waste in the wet season, is being developed by a system of river locks and weirs.

Geologically, A. seems to consist chiefly of Palaeozoic and Cainozoic or Tertiary formations, though Mesozoic or Secondary deposits have been revealed. The Grampians, Pyrenees, Great Dividing Range, Australian Alps, in Victoria, the Blue Mts. in New S. Wales, the Dividing Range in Queensland, consist chiefly of Silurian strata interrupted here and there by granite, syenite, etc. This Silurian character also dominates S. A.; a large area to the S. and W. of W. A. shows igneous rocks, while traces of Palaeozoic elements are found in the Darling Range. There are no Carboniferous rocks at present known in S. and W. A. Metamorphic rocks occur at intervals in Queensland and in the N.W. of Arnhem

**Land.** In New S. Wales and the S.E. of Victoria sandstone is found among the older substances. A huge area of the continent abounds in Tertiary deposits stated to be Pliocene. These formations include the desert sandstone, coral limestone, and to a large extent the conglomerates and clays of the gold diggings. The earliest discoveries of gold were made in recent and Tertiary alluvia. Quaternary deposits occur in the Upper Macquarie and Upper Murrumbidgee rivs., and they are rich in fossils which supply an illuminating knowledge upon the past fauna of A.

The botany of A. contains many characteristics both unique and phenomenal. Its species number many more than are found in all Europe. A feature of the trees growing on the coast highlands is their uniformity of shade. This is a dark olive, and is observed on both the upper and under surface alike. Their foliage extends in a vertical direction, and hence there is a great increase in the amount of available sunlight. In large and monotonous areas is the 'scrub,' a plant of dismal and unbroken appearance. It contains, however, one agreeable type, that of the tea-tree, a flowering shrub and a species of the *Melaleuca*. This is found in nearly every part of the continent. The forests contain many giants, among which is the gum-tree, or *Eucalyptus* (*q.v.*), attaining a height of 250 ft., with a girth of 12 to 20 ft., while in the S. there are many trees which grow to over 300 ft. high. The valuable she-oaks, beef-woods, or *casuarinas* frequent the S., W., and interior. They bear no leaves and have at the termination of their branches rigid drooping 'tails.' The jarrah, or Swan R. mahogany, through its power to resist the attack of the white ant, is used for railway sleepers and piles. The most interesting feature is the acacia. It is represented by 300 species, and with their striking yellow blossoms and fragrance provide a great source of beauty. Here and there are spots most luxuriantly vegetated. Palms, Indian figs, creepers, ferns, flame-trees combine to form a harmony of colour. The flame-tree is so named from the effect it presents when in blossom. Its clusters of red flowers, indeed, are sufficiently conspicuous on the mts. to act as a signal to ships miles out at sea. Araucarian pines are now confined to A. and adjacent regions. Many European trees have been successfully introduced, and the Scotch thistle, from its readiness to develop, has caused the different municipalities much expense in its extermination.

But if the flora of A. presents strange characteristics, the zoology is even more striking. The mammals of other lands are absent to a remarkable degree, while the pouch-bearing animals, here so prolific, are only represented elsewhere by the opossums of America. Of these marsupials the largest is the kangaroo, which attains a height of 6 ft. Other varieties are the wallaby, the hare kangaroo, and the rat kangaroo. In

New S. Wales and Queensland the fruit-eating bat is found, while seals and sea lions frequent the shores, that of Queensland abounding in the dugong or sea cow. Phalangers are nocturnal animals, feeding on leaves and inhabiting the hollows of trees. Flying opossums may be seen at night-time, while the flying mouse, of extraordinarily minute dimensions, is a feature of the continent. Other animals include the tarsipes, a honey-sucker; the wombat, 3 ft. high, a root and grass feeder; the dingo or wild dog and the koala bear; native cats (*dasyures*), also marsupials and carnivores; the ant-eater of W. A., and the platypus. This last has no teeth, being provided with 2 flat, horny projections, and possessed of broad, webbed feet. The introduction of European creatures has proved only too successful. The prolific increase of the rabbit and sparrow has involved the Gov. in enormous expense in the attempted suppression of the now-recognised vermin. Originally introduced for the purposes of exploration, the camel is now used with great profit in outlying districts as a beast of burden. Australian birds excel those of more temperate lands in beauty of plumage and form. Those specially famous for their beauty are the parrot, cockatoo, regent bird, rifle bird, fly-catcher, and lyre bird. A scarcity of fruit and an abundance of flowers cause the prevalence of flower-eating birds, among which are the varieties *Meli-phagidæ* and *Trichoglossidæ*. The emu and cassowary belong to the same family as the ostrich of Asia and Africa. A strange and unsightly bird is the podargus, commonly known as morepork, from its queer cry. There are altogether 650 different species of Australian birds, while Europe can boast only 500. There are many snakes, and though the viper is unknown, the *Elapine* (which include the Indian cobra) comprise the majority of Australian snakes. Though all are venomous, only 5 kinds are fatally so. Fish teem in rivs. and the sea.

The aborigines of A. may have come from the Malay Peninsula, driven thence by wilder and fiercer tribes. They were probably the most backward, in some respects, of any of the aboriginal tribes. They were entirely a hunting race, and had not developed on the agric. side at all. But at the same time they had developed a system highly satisfactory to themselves by making each man responsible for a certain amount of supplies. They developed also a highly graduated language, to which a considerable grammar attached itself. The aborigines of A. are coffee-coloured, and quite separate from other coloured races, and though their height is that of a European, their physique is very inferior. Apart from the ordinary application to the human senses, the intellect of the aborigine is little developed. Certainly in tracking and running down his prey he is unsurpassed. Attempts at the portrayal of sharks and other creatures are very crude. Beyond the manufacture of primitive weapons and domestic articles, he



does nothing except under supervision. Marital relations are most elementary. His wife is valued as property with his club and spear. Her appearance is or was generally marked by spear-wounds received as punishment for supplying insufficient vegetable food, for this is her part of the contract. Among their weapons is the boomerang. This is a curved stick which is thrown with sufficient dexterity to ensure its return to the owner. Outside the family rule there is no gov. whatever, and as for religion, their only inclinations towards the supernatural are contained in a dread of ghosts and demons. Their life is necessarily nomadic, as they are insufficiently intelligent to practise thrift, and hence abandon a locality as soon as its resources are exhausted. Civilisation of course has caused their rapid disappearance, and while some are to be seen working as stock-men on farms, most follow their original mode of existence.

The aborigines could offer but little resistance to colonisation by Europeans, and some became victims of outrages at the hands of the settlers in retaliation for thefts and murders of white men. At times a policy of repression was followed as in Van Diemen's Land in 1835, where a lieutenant-governor organised a systematic hunt for natives, and although he failed to capture all of them, the aborigines there soon joined the ranks of vanished races. But the 'black-fellows' on the mainland were more fortunate, and the continent gave them a refuge until such time as the missionary and humanitarian sentiment had become sufficiently interested to intercede effectively in their behalf. Misconceived policies, rather than actual ill-treatment, have led to the degeneration, decline, and sometimes extinction of the aborigine. Neglect has, often enough, played its part, but missionary effort and 'protectorates,' extending back into the early Victorian period, greatly weaken this old charge and that period was characterised by a most intensive effort to civilise the aboriginal. But however well-meaning may be the efforts of humanitarians, literature over a long period, on the Australian aboriginal, leaves a definite impression of his marked inferiority in the scale of human civilisation. Their numbers would appear to be still on the decline, for full-blood aborigines are stated to number 47,000 (1946) whereas in 1939 there were 51,557. In Queensland to-day some 75 per cent of the natives are self-supporting—employed under supervision in pearl and trochus fisheries and by station managers in cattle-raising; but this relative success is due to Queensland's climate and wide and comparatively unsettled spaces, and also to the foresight of its 'protectors' in encouraging the natives to take up occupations less in conflict with their habits and inclinations than agriculture.

In general Australian policy in the management of its aboriginal pop. in recent years has undergone modifications compatible with a more idealistic outlook. At the Conference on Aboriginal Welfare

held in Canberra in 1937 the Chief Protector for the N. Ter. declared that unless the black pop. were soon absorbed in the white, the white would be absorbed in the black in about a century and a half (i.e. owing to the rapid increase annually of 'mixed bloods'). The Federal Gov. now realised that its local administration of the aborigines of the N. Ter. was most inadequate, and its expenditure *per capita* incredibly mean, especially as compared with the liberality of the U.S.A. towards their aboriginals and of the sev. Australian states in the administration of the aborigines in their control. Lyons and Menzies, during their terms of office as Prime Minister, both improved matters by inclining to something in the nature of a 'new deal' for the aborigines, while Curtin extended certain social services to cover the aborigines. In 1944 the Commonwealth Gov. incorporated in its referendum proposals a request to take from the states the management of the aboriginal pop. (See also under *History* and see E. J. B. Foxcroft, *Australian Native Policy*, 1941.)

A. is politically divided into six states, the Is. of Tasmania forming an integral part of the Australian Commonwealth. Added to these are the Ters. of N. A. (cap. Darwin), Central A. (cap. Alice Springs) and Federal Cap. Ter. (Canberra). The pop. of the whole commonwealth in 1911 was 4,455,005, which showed an increase of about 700,000 during the preceding 10 years. The pop. (exclusive of full-blood aborigines), according to the census of 1921, was 5,435,734, or 980,700 increase during the preceding decade; the 1933 census showed a total pop. of 6,629,839, an increase on 1921 of 1,194,105; and the estimated figure for June 30, 1946, was 7,448,603, an increase of 818,764 on 1933. The rapid increase has been due mainly to natural expansion, by which is meant the excess of births over deaths. Immigration since 1891 has been comparatively slight. The above pop. is exclusive of deaths of defence personnel, and of aborigines, who are estimated at 47,000. The total estimated white pop. in 1946 was made up of:

New S. Wales	2,324,656
Victoria	2,030,887
Queensland	1,091,226
S. Australia	636,460
W. Australia	494,080
Tasmania	251,063
N. Ter.	5,250
Australian Capital Ter.	14,981
Total	7,448,603

The area of the different states and ters. is:

New S. Wales (inclusive of Federal Ter.)	sq. m. 309,432
Queensland	670,500
S. Australia	380,070
Tasmania	26,215
Victoria	87,884
W. Australia	975,920
N. Ter. and Central Australia	523,620
Total	2,973,641

Six of the Australian cities contain a pop. of over 100,000, and there are 30 whose inhab. number over 10,000. The chief cities are Sydney, 1,398,000; Newcastle, 128,000; Broken Hill, 26,500; Wollongong, 19,000; Goulburn, 16,000; Cessnock, 15,000; Lithgow, 14,000; Lismore, 21,000; Wagga Wagga, 14,000; Maitland, 13,000; Albury, 13,000; Bathurst, 12,000; Tamworth, 11,000; Grafton, 10,000; and Orange, 10,000 (New S. Wales); Melbourne, 1,170,000; Geelong, 41,000; Ballarat, 39,000; Bendigo, 31,000; Warrnambool, 9000; and Mildura, 7000.

ann. figure of approximately \$50,000,000 (the figures, in Australian currency values, were, \$262,529,000 in 1936-37; \$246,984,000 in 1937-38, \$242,629,000 in 1938-39, and \$269,260,397 in 1945-46). Compared with the wool industry, those of cattle and horse-breeding are of lesser importance, though there are possibilities of extensive increase in the oversea trade. In dairy produce the assistance of improved methods of refrigeration in water carriage has given the trade great impetus, and has materially extended the markets for beef and mutton.



*Australian Government*

AN AUSTRALIAN MERINO SHEEP STATION  
Sheep being brought in from the back country for shearing.

(Victoria); Brisbane, 385,000; Rockhampton, 34,000; Townsville, 37,000; Toowoomba, 34,000; Ipswich, 26,000; Cairns, 15,000; Maryborough, 15,000; Bundaberg, 15,000; Mackay, 12,000; Gympie, 8000; and Charters Towers, 8000 (Queensland); Adelaide, 360,000; Port Pirie, 13,000; Whyalla, 8,000 (South A.); Perth, 263,000 (including Fremantle, 28,000); Kalgoorlie, 11,000; Boulder, 7000; and Bunbury, 7000 (W. A.); Hobart, 54,000 (with suburbs, 71,000); Launceston, 36,000 (Tasmania); and Canberra, 12,200 (Australian Cap. Ter.).

As the continent is fundamentally of a pastoral nature, products of the flocks and herds form the chief element of Australian commerce. A line drawn along meridian 145° encloses with the Great Dividing Range a huge natural pasture, equipped with natural advantages for the growth of wool. Of the world's sheep, those of A. represent one-sixth, and the value of the wool export has reached, in 50 years, the colossal

As a source of wealth, agric. pursuits come next in order of importance. Originally wheat was cultivated only in the coastal strips, but experiments further inland within the 20- to 40-in. rainfall dist. have been attended with much success. Within the last 17 years the value of wheat and flour export has more than doubled itself. In 1910 it was represented by over £11,000,000, and in 1937-1938 the total value of wheat and flour exports was £27,040,000, in 1938-39 £13,275,000, and in 1945-46, £217,569,946. Other important crops include maize, oats, hay, potatoes, sugar cane, and wine. The chief wheat districts, are in Victoria, S. A. and New S. Wales. Maize and sugar cane are cultivated in New S. Wales and Queensland, while the vine is grown in all the states. Fruit is both large in quantity and rich in variety and quality, the prin. kinds exported being oranges, pineapples, bananas, and apples. Timber exports were valued at £1,280,000 in 1937-38 (in 1938-39,

£927,000, but in 1943-44 the figure fell to £272,000; in 1945-46, £249,000. The timber wealth of A. lies chiefly in the E. and a part of the W. coastal belts. Fishing is followed with some advantage, and oyster cultivation for the purpose of collecting pearls is to be recognised.

A. is one of the greatest gold producers in the world. The mineral is found throughout the continent. It is obtained principally from quartz reefs, though many alluvial deposits are still yielding. Victoria is the busiest centre and possesses some very deep mines. In the Bendigo dist. 8 mines are over 3000 ft. deep. In New S. Wales dredging is adopted to win gold from river deposits. Copper exists in all the states, and in S. A., New S. Wales, Queensland, and Tasmania is extensively worked. Tin and iron also exist, and although the latter is found distributed all over the continent, it has been little worked in the past on account of the lack of capital necessary to commence operations. The ann. pig-iron production is about 900,000 tons. Other minerals include antimony, bismuth, manganese, platinum, tellurium, lead, mercury, titanium, wolfram, zinc, nickel, cobalt, uranium, and arsenic. Australian states are plentifully supplied with coal. It occurs in 5 varieties, and attempts were made to use brown coal (lignite) for ordinary fuel, but without success. 13,886,000 tons of black coal were produced in 1946. Asbestos has been discovered in New S. Wales, and many specimens also in W. A. Of gems, diamonds are found in all the states, and the search has been organised only for these stones and opals. Other precious stones include the sapphire, emerald, ruby, amethyst, garnet, topaz, turquoise.

A. makes over 2,000,000 tons of the world's cheapest steel, and about two-thirds of the machine tools required by her rapidly expanding industrial plants.

**Exports and Imports.**—The total value of the imports in the year 1945-46 was £103,793,341, the prin. items being arms, ammunition, and explosives, £18,114,000; oils in bulk, £17,441,000; vehicles and parts (including aircraft), £14,270,000; cotton and linen piece goods, £8,183,000; motive power machinery (except electric), £7,014,000; silk, £6,237,000; electrical machinery, £5,051,000; tobacco, cigars, and cigarettes, £4,683,000; tea, £4,546,000; drugs and chemicals, £3,992,000; yarns, cotton, and Amer. silk, etc., £2,627,000; fertilizers, £2,221,000; paper and printing, £2,201,000; stationery and books, £2,146,000; bags and sacks, £1,912,000; seeds, £1,787,000; hessians and jute piece goods, £1,271,000; timber undressed, £1,125,000; tools of trade, £1,071,000; canvas and duck piece goods, £1,056,000. The exports were £184,360,000; the chief items being wool, £69,280,000; gold, £26,411,000; meats, £14,011,000; butter, £12,272,000; hides and skins, £11,836,000; flour, £11,337,000; wheat, £6,223,000; lead (pig and in matte), £4,222,000; arms, ammunition, and explosives,

£3,831,000; sugar (cane), £3,080,000; vegetables (preserved), £2,699,000; piece-goods, £2,474,000; zinc bars and blocks, £2,266,000; iron and steel manufs., £2,196,000; milk and cream, £2,156,000; dried fruits, £2,140,000; eggs, £2,090,000; concentrates and ores, £1,739,000; cheese, £1,689,000; jams and jellies, £1,342,000; fresh fruits, £1,265,000; fruits (preserved), £893,000; wine, £741,000. Gold exports which in 1938-39 were £1,459,000 (out of an output worth £14,026,615) rose to £26,411,299 in 1945-46. The ratio between exports and imports shows an excess of imports in the earlier years of Australian trade, but this increase represented the introduction of capital into the country in the shape of Gov. loans or for investment in private undertakings; the excess of exports in later years represented the interest and profit on these loans, repayments of loans overseas, and freight on trade borne on vessels of the United Kingdom and foreign countries. In recent years (apart from the war-time year 1943-44, when the adverse balance was £63,000,000) the balance of trade has sometimes been greatly in favour of imports, in 1923-1924 the excess being £24,000,000. This was due to A.'s requirements in the way of machinery and manufs. of metals, including motor cars and other vehicles, apparel, textiles and manufactured fibres. The year 1930 saw, however, a crisis in Australian trade, the slump in both the wheat—due chiefly to a disastrous drought—and wool exports resulting in so serious an adverse trade balance that the A. Federal Gov. under Mr. Scullin (Labour), who defeated Mr. Stanley Bruce (Conservative) in 1929 on the issue of Federal or State control of industrial arbitration, found it necessary to curtail imports by a drastic protectionist tariff, the primary object of which was to encourage Australian manufs. at all costs. At the same time, too, the Gov. decided to suspend assisted immigration for all settlers but farm boys and domestic workers. All this had a bad effect on Australian credit and made it difficult to float a loan in London. But the Brit. Gov. agreed to the suspension, from the year 1931-32, of the repayment of prin. moneys due under the funding arrangement whereby the War Loan debt was to be extinguished about 1956, and of the interest moneys from 1932 to 1933; and in 1931 the internal debt of £558,000,000 was the subject of a voluntary conversion plan directed to financial rehabilitation. The country quickly recovered and, by 1937-38, the revenue was £89,458,000 or £4,395,000 over expenditure (in 1938-39 the revenue was £95,065,000 and expenditure £98,031,000), and in 1943-44 the revenue was £467,156,000 and expenditure £464,828,000 (the totals for the 6 states being £169,616,000 and £167,288,000 respectively). Steamship routes connect Australia with London and other Brit. ports, Germany, Belgium, France, Italy, Japan, China, India, San Francisco, Vancouver, New York, and Montevideo.

*The Commonwealth Government.*—According to the Constitution Act of 1900 the gov. of A. is represented by a governor-general, who stands for the king. A Senate consisting of 36 members, 6 from each original state, and directly elected by the people of the state, operates for 6 years. Next is the House of Representatives, which consists of 75 members elected for 3 years by the Commonwealth. These are proportionate to the pop., with a minimum of 5 representatives for each state. In 1939 there were 28 for New S. Wales, 20 for Victoria, 10 for Queensland, 6 for S. A., 5 each for Tasmania and W. A., and 1 from the N. Ter. The governor-general has 7 ministers. In the general election of 1946 the Labour Gov. was returned to office with the loss of only 6 seats (Labour, 44; Liberal, 17; Country party, 12; Independent, 1. Senate: Labour, 33; Opposition, 3).

*The Commonwealth Constitution.*—Efforts have been made to alter the Constitution of 1900, but resolutions for that purpose submitted to a referendum have generally been rejected. In the 1913 election 6 questions were submitted, all but 1 being repetitions of old proposals to extend the legislative powers of the Commonwealth Parliament over trade, commerce, industrial matters, monopolies, trusts, and corporations. The new proposal referred to railway disputes. All were rejected, but by smaller majorities than previously. In 1926 a referendum was taken to alter the Constitution so as to give wider legislative powers in regard to industry and commerce and essential services, but in both cases the electorate decided against the proposals. The inference is that the individual states are in no mind to give the Commonwealth overriding powers, especially in regard to trades disputes. In 1934-35, the primary producers of W. A., feeling themselves at a great disadvantage vis-à-vis the E. states of the country, induced the W. Australian Gov. to petition the Imperial Gov. to pass an Act enabling the state to secede from the Australian Commonwealth. Their petition was rejected on the ground that the matter was essentially one for the Federal Gov. In 1937 a referendum was held on the Federal Gov.'s proposals that the Commonwealth Parliament should be able to make laws regulating air navigation and aircraft; and that it should also have power to pass laws controlling interstate trade. Both proposals were rejected. Three Bills were introduced in 1946 to amend the Constitution in order to expand the federal power in the social services; to legislate for the organised overseas marketing of primary products; and to regulate wages and conditions of employment; but the first only of these proposals survived the referendum. In May (1946) it was decided to set up a national medical service throughout A., the service to be free and without any means test.

*New Capital.*—Up to 1927 the Commonwealth Parliament sat in Melbourne in the State parl. buildings, the Victoria

Parliament occupying the Exhibition building. The site for the cap., which under the Constitution must be not less than 100 m. from Sydney was fixed in 1908 at Canberra. The first meeting of the Federal Parliament at Canberra was held in 1927, the inauguration ceremony being performed by the duke of York (now King George VI.).

*Immigration.*—In 1920 an arrangement was arrived at between the Commonwealth and state govts. under which the Commonwealth is responsible for the recruiting of immigrants abroad and for their transport to A.; the function of the state Govs. is to advise the Commonwealth as to the numbers and classes of immigrants they are prepared to receive. Contributions towards the passages of approved settlers are jointly donated by the Brit. and the Commonwealth Govs. In 1925 the 2 Govs. entered into an agreement to make available to the various state Govs. loans at a very low rate of interest, to enable land to be made available for settlement or such public works to be carried out as might tend to develop settlement areas and so attract a greater pop. The maximum amount of loan moneys provided for was £34,000,000, and, up to 1930, about £9,000,000 had been lent, when the policy of assisted migration was suspended and the £34,000,000 agreement terminated. There was no resumption of assisted passages until 1938, when the Commonwealth Gov. decided to grant such passages to United Kingdom residents nominated by individuals or by approved organisations, to household workers and farm youths requisitioned by a state, and to pensioners. The total number of assisted immigrants for the 11 years 1914-24 was 939,472, the average for the last few years being 25,000. In 1939, following the 'cession' of Austria and Czechoslovakia to the Ger. Reich, A. offered to take 15,000 immigrants in the succeeding 3 years. In 1946 the Brit. and Commonwealth Govs. agreed to schemes to provide free passages to United Kingdom ex-service personnel and their dependants, and assisted passages at low rates to other Brit. residents of the United Kingdom not eligible under the free passage schemes. The question of immigration and a 'white A.' is one of the most difficult problems which the Australians and the Brit. Empire have to face. The Australians refuse to admit on equal terms Asiatics, especially Jap. and Chinese.

*Discovery and Exploration of Australia.*—The actual date of the discovery of A. is doubtful. Various claims are made, among them the sighting of W. A. in 1522 by Magellan's followers. In 1598 it was mentioned in a book by Cornelius Wytfliet. Torres Strait refers to a visit there by Torres in 1606, while Dirk Hartog Is. recalls Dirk Hartog in 1616. In 1618 a Dutch vessel *Amherst* explored the coast of Arnhem peninsula. As far as known the first Brit. sight of A. took place in 1688, when Dampier gave his name to an archipelago in the N.W.

In 1770 Capt. Cook, during a circumnavigation of the globe, explored the entire E. coast from Gippsland in Victoria to Cape York. In 1790 Surgeon Bass gave his name to Bass Strait, and in 1792 Lt. Flinders named a range of mts. in S. A. and also a riv. discharging into the gulf of Carpentaria. The exploration of the whole coast was completed by Darwin in the *Beagle* in 1837-1843. In 1788 the first Brit. settlement was made at Port Jackson (where Sydney now stands). Brisbane R. was opened up next by Oxley, and in 1824 Hamilton

same time another expedition under Burke and Wills was begun. The result unhappily was very different. They started from Melbourne, and at Cooper's Creek abandoned the bulk of their elaborate equipment. They advanced alone, and reached the gulf of Carpentaria near the mouth of the Flinders. Returning, they *d.* of starvation at Cooper's Creek. With the object of searching for the missing explorers, McKinlay crossed the continent to the Albert R. and proceeded thence to Burdekin R., travelling eastwards to Port



*Australian Government*

#### SYDNEY HARBOUR BRIDGE, NEW SOUTH WALES

It is constructed to carry 4 lines of electric railway, 6 lines of vehicular traffic, and 2 footways.  
The bridge was opened in March 1932.

Hume reached the Murrumbidgee. Five years later he travelled from Sydney to Port Phillip, crossing the Upper Murray on the way. The exploration of the Murrumbidgee to its junction with the Murray, and the Macquarie to its junction with the Darling followed. In 1840 E. J. Eyre (subsequently governor of Jamaica) discovered Lake Torrens, and in the following year accomplished the perilous and distressing but successful feat of a march of 1209 m. from Adelaide to King George's Sound. In 1845 Capt. Sturt started from the Darling and reached a point after many privations within 150 m. of the centre of the continent. Of all Australian attempts at exploration one of the finest was the passage across the entire continent from N. to S. It started from Adelaide to a place to the W. of Chambers Bay in 1862, and was successfully achieved by J. M'Douall Stuart. Practically at the

Denison in Queensland, 800 m. of the N.W. coast were explored by F. T. Gregory in 1861. Attempts were encouraged to the W. coast by the installation of the telegraph line in 1872, and Giles started from Chambers Pillar, but in spite of desperate determination only reached 100 m. to the N. of Lake Amadeus. Later, in 1873-74, he started 200 m. farther S., and this time reached halfway across to the W. coast. At the same time Col. Warburton started from Alice Springs, just N. of the tropic, and with the aid of camels arrived at the R. Oakover in W. A. In 1874 John Forrest, using only horses, reached the wire just to the N. of Peake Station, from Murchison R. on the W. coast. In the next year Giles crossed from the head of St. Vincent Gulf to Perth, having experienced in his crossing of 2500 m. country altogether unfit for settlement. In fact for over 1000 m. he had a chronic

struggle with that stubborn difficulty, the Australian scrub. The first settlement was made at Port Jackson in 1788, consisting of over 1000 convicts. Moreton Bay, in 1825, was adopted as a settlement, and in 1859 had risen to the position of a separate colony. Queensland now occupies the original site. In 1829 the Swan R. settlement took place in what is now W. A. From 1851 to 1889 it was a penal settlement. Edward Henty, a Sussex sheep farmer, settled in Portland Bay in 1834, and in 1837 settlers colonised Port Phillip, thus choosing the site of Melbourne for the nucleus of a new colony, later named Victoria. These 2 events were commemorated in the centenary celebrations in Melbourne in 1934, when the duke of Gloucester was invited to represent the king. Brit. colonisation of S. A. dates from 1836.

*Hist. of Australian Settlement.*—The first settlements by white men seem to have been made about the middle of the sixteenth century, but probably for thousands of years the aboriginal tribes had occupied the whole of the continent. The Portuguese were constantly sending out exploring parties to discover this unknown world, and the Spaniards, especially from their settlements on the W. coast of S. America, also sent out expeditions. Some of these explorers actually sailed within sight of the coasts of A., yet failed to recognise the existence of a new continent; and though for centuries geographers had assumed the existence of a S. continent and numerous explorers sought it, the true facts were only estab. by Capt. Cook (*see under TERRA AUSTRALIS INCOGNITA*). Following on the explorations by the Spaniards and Portuguese came the explorations by the Dutch. From the E. Indian Is., the Dutch sent out many exploring expeditions which failed only because their commanders did not fully realise the significance of the discoveries which they had actually made. The journey from the Cape of Good Hope to their possessions often led them to the W. coast of A., and gradually belief in the existence of a New Holland hardened. Under the regime of the governor, Van Diemen, many discoveries were made and many expeditions were sent out. The chief of all these expeditions was that under the explorer Tasman, which led to the accurate charting of the N. and W. coasts of A., and to the discovery of Van Diemen's Land (Tasmania) and New Zealand. Even now the full significance of the discoveries was not grasped, and with the death of Van Diemen and Tasman, exploration on a large scale died out for nearly a century. The part played by Englishmen in the exploration of the early days was small. Dampier was the only Englishman to bring back any report of A., and his report was so bad that no further attempt was made until Cook discovered that part of A. which is now known as New S. Wales. Cook's discovery was important, though the real significance of his voyages lay in their finally disproving the theory of an

immense S. continent. Of more positive importance was the report of Joseph Banks, the scientist, on the fertility of the land in the vicinity of Botany Bay. It was through his reports that A. came into popular view as a possible settlement for Eng. colonists. The early gov. of Australia, it is no exaggeration to say, owed its existence to Joseph Banks, for he alone stood between A. and the imperial Gov. in persuading them to renounce their decision to abandon settlement there. The first colonial project, as far as New S. Wales was concerned, was for the settlement there of a number of the refugee loyalists of America later known as the United Empire Loyalists. They finally settled elsewhere, but during the negotiations for settlement in New S. Wales it had been decided that, should they settle there, they should be protected by the Brit., and should also employ convicts from Britain to supply their labour. The first colonists largely consisted of convicts, and it was with men such as these that Capt. Arthur Phillip, R.N., the first Brit. governor of New S. Wales, had to develop the ter. reported by Banks as fertile and easily developed. Their success, as may be imagined, was not great; amongst the convicts there were none with pretensions to skill in agriculture, and above all, the land reported by Banks as so fertile turned out to be just the opposite. Still, in spite of difficulties some progress was made, some settlements were founded, and the tn. of Sydney began to be built. The colony, however, remained for some considerable time far from being self-supporting, and often the whole settlement was placed on short rations. The difficulty of maintaining discipline was also a great problem, but the greatest of all difficulties at the beginning proved itself in the convict guards. Enlisted from men who were more or less blackguards, officered by men who regarded A. as a purely financial speculation, they speedily obtained overwhelming authority, exploited the colonists to the best of their ability, and mutilated when the offences of which they had been guilty brought down the censure of their superiors. During this period, however, the coasts of A. and Tasmania were explored. The fallacy that Tasmania was part of the mainland was exploded, and developments in the number of convict settlements resulted from the new discoveries. The names which are most famous in this context are those of Bass and Flinders. Many of the settlements made were, however, unsuitable, and the settlers soon left them in disgust. The founder of A.'s greatest industry was one John McArthur. He experimented with the Sp. merino sheep, found the country admirably suited for the rearing of such animals, and proceeded to make this sheep industry the essential industry of A. He took the part of the convict guards against the governor, Bligh, and had him imprisoned by the mutineers for 2 years, during which time the convict guards were

the sole rulers of the colony. This mutiny brought matters to a head in A., the home Gov. adopted a fresh policy, and the governors appointed in future were not sailors but soldiers. The new policy also was a more reasonable one. A. was no longer to be regarded as a huge gaol. The convicts sent out there might speedily by good conduct earn their release and become property-owning citizens themselves. The emancipated convicts under the governorship of Macquarie began to build up a new society, but whereas many results were good, many of the attempts were failures. In the meantime the exploration of A. went on apace, and especially under the governorship of Brisbane was the colony developed. The next governor, Darling, was given great powers, and the colony was remodelled, being now made into a colony inhabited by freemen to whom the convicts were sent as servants. But Darling was opposed to the policy of emancipation, and the cry for real liberty in the colony was soon so great that Darling was recalled in 1831. The policy of emancipation was continued, the constant stream of immigrants from England helped on the policy, and the emancipated convicts were soon, by their good behaviour, able to palliate the memory of their crimes. Tasmania was made into the real penal settlement, and this quieted down into an orderly and disciplined country. With the development of New S. Wales went also the development of other parts of A. The Fr. had long desired to make settlements on the continent, and the Brit. Gov. had to hasten in order to prevent their doing so. The W. parts of A. were occupied between 1820 and 1830, and the Gov. adopted in part the ideas of James Peel. They advertised for settlers, to each of whom was to be given 40 ac. of land for every £3 or £3 worth of goods that he took out with him. But the policy of land giving was bad, for the smaller settlers quickly found themselves with property miles from any tn. and of bad quality, whilst the larger landowners, given the first chance, had appropriated the land in the vicinity of the tns. and of the best quality. Another problem which began now to face the white pop. of A. was the lack of servants, whence the necessity for an increased immigration. The experiments tried on this occasion were not worthy of success, and, further, did not succeed. These experiments in land and in the servant question had been carried out respectively in W. and S. A. But now under the able governorship of Rourke and Gipps in New S. Wales that colony was beginning to demand that it should be given self-gov. and that England should cease to send convicts to it. The transportation of convicts to the mainland of A. ceased in 1840, and the convicts were replaced by means of a system of assisted immigrations. In the meantime, in spite of considerable opposition, Port Phillip had been estab., and a year later came the

establishment of the tn. of Melbourne. By 1842 New S. Wales had developed to such an extent that she was granted a constitution and a council partly elected. A question which now agitated New S. Wales was the attempt of the home Gov. to commence again sending convicts to the colony. The convicts were not allowed to land, and the colonists definitely decided that in future no convicts would be allowed to be transported to A., and following on this came the freeing of Tasmania from the convicts who had previously been sent to it. In 1851 the colonies which were in existence were: New S. Wales, Tasmania, S. A., and Victoria (the last having then but recently objected to the union with New S. Wales, and been successful in obtaining separation). The gold rushes which commenced in 1848 were not a source of undiluted benefit to the Australian Gov. Frequent riots took place with which in many cases the Gov. was not capable of dealing, the most famous of these being the Eureka stockade episode. The gold rushes were, however, on the whole, of considerable benefit to practically all the Australian colonies, which profited by the increased trade and wealth which these rushes brought about. In 1855 S. A. received a constitution, and in 1859 we have the establishment of Queensland. Exploration had, in the meantime, continued to a great extent, and the hitherto unknown parts of A. were opened up. Since the grant of self-gov. to the Australian colonies many grave problems have had to be faced and solved.

*Establishment of the Commonwealth.*—The tendency set in rapidly towards the closer union of the colonies in a commonwealth, an object which was brought to a successful issue at the beginning of the present century. The colonies, however, had also the problems of the land question, education, railways, and immigration to settle. The land question, which was to A. the most important, seemed to have been settled when it was upset by the gold rushes, but the Torrens Act did much to settle disputed claims to land. The question of education provoked serious controversy, but was finally settled. While the ages of compulsory attendance at school vary, each state has a system of compulsory education. At Sydney, Melbourne, Adelaide, and Hobart are public univs.

In religion, no church is subsidised by the State, and the percentages of attendance at those of the various denominations are roughly as follow: Church of England 39 per cent, Rom. Catholic Church 22 per cent, United Methodists 12 per cent, Presbyterians 11 per cent, Congregationalists 2 per cent, and Baptists 2 per cent. In the matter of railways it was only natural that in order that the country should be fully developed the railway system would have to be perfected. The various states began after 1870 to develop the railways, and since that date over 27,900 m. of railways have been constructed, the money borrowed

for the purpose being a heavy burden to the pop., but the benefits which accrued being enormous. Most of the railways converge on state caps. After the Second World War the Commonwealth Gov. decided to proceed with the standardisation of railway gauges throughout A. The proposal was approved by the states, on the Commonwealth agreeing to accept responsibility for half the cost. A Bill to standardise gauges in New S. Wales, Victoria, and S. A. was passed.

*Hist. of A. during and after the First World War.*—The solidarity of the Australian people in the crisis of 1914 was an eloquent testimony to the strength of the bonds of empire. The Commonwealth Gov. put a div. of troops at the disposal of the Imperial Gov. as soon as the war began, and a small, highly efficient force was promptly sent to Ger. New Guinea. At no time did A. adopt conscription, though attempts were made to introduce it. This refusal was probably due, said the late Sir Charles Wade, agent-general for New S. Wales, to an entire misconception of the issue involved. Yet the sympathy of the Australian people for the allied cause was unmistakable, and, in its results, their voluntary effort was remarkable. Out of a pop. of less than 5,000,000, 400,000 enlisted, i.e. 8 per cent (the normal percentage in a conscript country is 10 per cent, but in the First World War this was exceeded). Their total casualties were approximately 214,000, of which the dead amounted to 55,585, and the prisoners of war to less than 200. Sixty-three Australians were awarded the V.C. and 16,814 were awarded other military honours. Australian forces took part in every theatre of war, but it was the Gallipoli campaign that shed an imperishable lustre on their endurance and bravery (see ANZACS; GALLIPOLI CAMPAIGN). They fought also in defence of the Suez Canal and on the Salonika front in the early years of the war. In 1916 the Anzac Corps went to Flanders, where in the Somme battles of that year they were engaged in the heavy fighting at Pozieres, Fromelles, and Mouquet Farm. The following year they were engaged in the battle of Arras, battle of Messines, Ypres battle, 1917 (third battle of Ypres), including the thankless struggle of Passchendaele and the battles for Polygon Wood. In the Somme battles of 1918 they rendered vital service in stemming the tremendous Ger. onslaught towards Amiens, joining in the historic counter-attack on Apr. 24, when the important position of Villers-Bretonneux was retaken (battle of the Lys). At Beaumont-Hamel (July) they took part in an effective combined attack of tanks and infantry. In the concluding battles of the W. Front the Anzacs were conspicuous in the second battle of Bapaume, especially at the capture of Mont St. Quentin (Aug. 31 to Sept. 3), a position which Gen. Rawlinson, commanding the Fourth Brit. Army, to which the Australians, under Gen. Monash, were attached, considered so

impregnable that he did not feel justified in attacking it. The initiative in this attack came from the Australians; they advanced day after day, undaunted by losses, but remorselessly breaking down the Ger. resistance. In the words of Gen. (afterwards Lord) Rawlinson, 'In the last hundred days the Australians gained a reputation which will live throughout Europe.' Elsewhere, their infantry and mounted troops co-operated in the victories of Gen. Allenby in Palestine, while yet other Australian forces took Ger. New Guinea, Nauru, and the Bismarck Archipelago, these former Ger. possessions subsequently mandated to the Australian Gov. under the League of Nations. The Australian Navy also took part in various operations, in the Pacific in 1914, in the W. Indies, and also in co-operation with the Grand Fleet in the North Sea. The Australian war debt was estimated at £300,000,000, of which two-thirds was raised in A. 2 years after the war. The interest on the debt represented £14,000,000, and the ann. charge for pensions was £5,000,000. A Navy Dept. was created in 1915, and Australian submarines rendered useful service in the war. Submarine *A53* was lost in the Dardanelles in 1915. The famous Ger. cruiser *Emden* was sunk off N. Cocos Is. by H.M.A.S. *Sydney* (1914). W./C. Goble and Lt. McIntyre accomplished the first seaplane flight round the continent in 1924, the year which saw the unfortunate loss of the battleship *Australia*. An impetus to Australian naval ambition was given in the same year by the visit of the Brit. cruiser squadron under Adm. Field.

Much of Australian hist. in the past 2 decades has been concerned with the Labour movement. From the nineties of last century, the Australian Labour party held the balance of power between the older parties and wrested concessions from them. It then entered into coalition with the other parties, but in 1915 it governed the Commonwealth and 5 of the states. In 1916, however, Labour split on the issue of conscription and, as the result, lost everywhere except in Queensland. In 1924 it again captured most of the state govts., but by 1929 had lost them all. Then came another sharp reaction, owing to the break in world prices of wool and wheat, and Scullin, the Labour leader, became Prime Minister, and, in a nationalist spirit, appointed his own governor-general in the person of Chief Justice Isaacs; but after A. had recovered from the world economic depression, the United A. party came into office under Joseph Lyons, who remained in office until his death in 1939, though in his last ministry he had to rely on an alliance with the leader, Earle Page, of the Country party. The United A. party's influence hardened in 1939 owing to the international situation, and all efforts were strained to the improvement of defence. Mr. Menzies succeeded Joseph Lyons as Prime Minister. Trade unionism, as it now exists in A., is the product of industrial arbitration,



a problem which throughout the twentieth century has been the most difficult in Australian domestic politics. It turned out sev. govts. in 1904 and 1905, and resulted in the overthrow of the Bruce-Page ministry in 1929. In the period up to the outbreak of the First World War nearly all the states' legislatures had introduced systems of compulsory arbitration on wages and working conditions. In 1928 Stanley Bruce's ministry passed an Act providing penalties for non-observance of awards and confirming the right of the Commonwealth Court to take secret ballots on union policy; but, unable to evolve a logical system in the administration of the Labour Arbitration Law, he introduced a Bill in 1929 to abolish the federal jurisdiction in arbitration cases and thus leave the whole working of arbitration to the states; but he was heavily defeated by the opposition under Wm. Morris Hughes. In the following year, the Labour movement made common cause under its political leaders and was returned to power by a great majority. Scullin, as noted previously, being Prime Minister. The task of his Gov. was to restore A.'s economic equilibrium, and in this it signally failed. The succeeding Lyons Gov. pursued a policy of sound finance, but maintained the new and increased tariff duties introduced by its predecessors in office.

*Hist. of A. during the Second World War (1939-45).*—Mr. Robert Menzies, formerly attorney-general, was elected leader of the United A. party in Apr. 1939, and became Prime Minister a week later. Mr. Casey, commonwealth treasurer, also being a candidate for the party leadership. Dr. Earle Page and other members of the Country party were excluded from the Gov., following a split with Mr. Menzies. A week before war broke out Mr. Menzies declared that if Britain were forced into war, Australia would stand by her side, thus giving the lie to Axis hopes that the Brit. Commonwealth would break and reveal disunity with the test of a new world war. Accordingly, on Sept. 3, A. declared war on Germany. Both the Labour and Country parties supported Mr. Menzies. Lord Gowrie, who, as governor-general, signed the proclamation of war, was continued in office, the new governor-general designate, the duke of Kent, having assumed a naval appointment. The militia force of 78,000 men was called up and an infantry div. of 20,000 enlisted for service in A. or abroad; and an Australian Air Expeditionary Force of 4 bomber squadrons and 2 fighter squadrons was offered to the Brit. Gov. A Bill authorising loans up to £20,630,000 for war purposes was passed. Compulsory military training, which had been abolished in 1929, was reintroduced, and it was decided that a special div. to be known as the Second Australian Imperial Force, should go overseas early in 1940, a motion by Mr. Curtin, Labour leader, opposing the dispatch of the forces on the ground that they were

needed in A. being defeated. The first squadron of the Royal Australian Air Force for active service in Britain landed there on Dec. 26. Early in 1940 an Australian contingent of troops landed in Egypt. It was decided also to recruit another div. for service abroad, and such further troops as were necessary to make up a full army corps, the plan involving the raising of an army of 90,000 men by June. The split with the Country party having now been healed, a coalition ministry under Mr. Menzies was formed (Mar.), a coalition which marked the renewal of a partnership which had been dissolved in Apr. 1939, after the death of the then Prime Minister, Mr. J. A. Lyons. In May Mr. Menzies announced the raising of a third div. for service abroad and the construction of a graving-dock for capital ships in Sydney. A., with the other dominions, declared war on Italy on June 10-11 (1940), thereby further emphasising imperial solidarity. In the same month the Country party, at a conference in Melbourne, resolved on complete participation in the Empire Air Training Scheme (which was being effectuated chiefly in Canada), the reinforcement of Australian Imperial Force divs. abroad, and compulsory military training, thereby abandoning the party's long-standing opposition to conscription. A Defence Corps, on similar lines to the Brit. Home Guard, was formed in the same month. On Aug. 13 3 Australian Cabinet ministers (Sir Henry Gullett, vice-president of the executive council, Mr. J. V. Fairbairn, air minister, and Brigadier Street, war minister), as well as Sir Brudenell White, chief of the army staff, were among 10 persons killed in an aeroplane disaster, the Lockheed-Hudson bomber, in which they were travelling to Melbourne for a Cabinet meeting, crashing near Canberra. A National Advisory War Council with Labour was formed in Oct., the Labour party, however, rejecting Mr. Menzies's proposal of a National Gov. or, alternatively, an executive war council in which the Opposition should be allotted half the seats. In Jan. 1941 it was decided to form an Australian Armoured Corps, together with an armoured div. for the Australian Imperial Force. In Feb. Mr. Menzies visited Britain for consultations with the Gov., and also visited the battle front in Cyrenaica where Australian troops were fighting. Although there was no doubt on the score of Australian unity, the Labour party still refused to join a National Gov., and, indeed, they continued to do so until they turned the tables on the other parties and formed an exclusively Labour Gov. The development of military operations in Greece, where the Australians had lost heavily in spite of their tenacity, gave rise in A. to apprehension and to criticism by the Labour Opposition, which complained that the War Advisory Council had not been consulted before the dispatch of the Australian troops. On May 27 Mr. Menzies's offer of half the seats in an

all-party Cabinet was again rejected by the Labour party. Sev. new ministries were, however, formed to speed up war production, and wider powers were taken to requisition factories and plant, prohibit strikes and lock-outs, and generally to enhance the war effort. The Volunteer Defence Corps was reconstituted as part of the citizen forces so as to provide for defence in depth and to engage in guerrilla warfare against the enemy wherever necessary. Yet again (Aug. 28) Mr. Curtin rejected an offer of an all-party Gov. There was admittedly a lack of political stability in A., though no want of unity in the people's will to defend themselves. On Aug. 28 Mr. Menzies resigned, and Mr. Fadden, leader of the Country party, became Premier, Mr. Menzies retaining his party leadership. Dr. Earle Page was sent to London as Cabinet liaison between the Brit. and Australian Govs., Mr. Menzies having refused this appointment himself. A.'s strength in armed forces at this date either on active service or ready for immediate mobilisation was: Australian Imperial Force, 200,000; Militia and Volunteer Defence Corps, 228,000; R.A.A.F., 124,000; R.A. Navy, 20,000. An Australian Women's Army Corps was also decided on so as to relieve men on non-combatant duties. The Fadden Gov. was, however, soon defeated on its budget, Labour opposing it on the ground that it made no true equality of sacrifice. Mr. Curtin now became Prime Minister, and with the support of the Independents formed a purely party administration. But so grave now was the crisis of the war and of the Jap. menace that the isolationist tendencies of the Labour party were forgotten in the realisation that the situation demanded the fullest co-operation with the Allies and the utmost national sacrifices. Thus the Curtin Gov. retained conscription for home defence, kept militia troops in the Pacific and Australian units in Malaya, and only recalled the Australian Imperial Force from the Middle E. after Japan had entered the war. A. had, perforce, co-operated with Britain in the policy of appeasement towards Japan, as, e.g. by either initiating or at least endorsing Britain's action in closing the Burma Road (q.v.). Inclined, generally, to pay more attention to domestic than to external affairs, A. could not but be alarmed at the growing threat of the Jap. advance in China and, before the Second World War, Lyons had proposed at the Imperial Conference that the countries bordering the Pacific should enter into a regional entente and mutual non-aggression pact. But 4 years later (1941) Jap. indications of their policy in E. Asia and the S. Pacific forced A. to realise that danger was imminent, and in that year the Australian Gov. sent forces into Malaya. Mr. Menzies warned the Australian people that A. had no option but to co-operate with the Brit. Commonwealth in the war. There were still, however, influential voices in A. which deprecated an 'alarmist' attitude in rela-

tion to Japan, but the attack on Pearl Harbour (q.v.) changed A.'s attitude in a moment and for the first time the people, theretofore confident in the protection afforded by the 'sure shield' of the Brit. Navy, were confronted with the probability of a racial war of the most extreme kind. But the Gov. acted with vigour and determination, calling up another 100,000 men for home defence and, like Britain, directing men and women to essential services. Britain co-operated by sending back the Australian Imperial Force, which was then sent to arrest the Jap. attack in New Guinea (q.v. and see also PACIFIC CAMPAIGNS IN THE SECOND WORLD WAR). One Australian div., however, remained in the Middle E. and, with the New Zealand contingents, rendered great assistance in checking the Ger. advance to Egypt. But these first steps were inadequate to cope with the Jap. drive through the Philippines, Java, and Brit. Malaya and, consistently with allied strategy, U.S. naval, military, and air forces, based on A., now provided that country with its main bulwark against Jap. aggression. In view of the seriousness of the situation the Australian Gov. tightened up controls of industry, increased taxation of incomes, and spent large sums on social services, therein following Britain's domestic policies. Despite these departures from labour tradition, the Australian electorate approved the Gov.'s general war policy, and in Aug. 1943 Mr. Curtin secured a decisive majority in the 2 houses of parliament. None the less he emphasised A.'s equal status with the other nations of the Brit. Commonwealth and her independence, especially in relation to political matters of Pacific concern. In a remarkable statement on Dec. 27, 1941, Mr. Curtin declared that A. 'looked to America free of any pangs as to her traditional links or kinship with the United Kingdom.' Yet while appealing for aid to America and Russia, he inconsistently underlined A.'s imperative need of foreign aid on the one hand and her independence of Britain on the other, and yet he was now asking Britain for direct representation on the Brit. War Cabinet in the formation and direction of policy and strategy in the Pacific. Russia could tender no aid, but America sent large forces to A., under the supreme command of Gen. MacArthur (q.v.) and indeed accepted a responsibility for both A. and New Zealand. Britain acceded to A.'s demand for representation on the War Cabinet, Mr. Stanley Bruce (q.v.) being appointed Commonwealth representative both on the Brit. War Cabinet and on the Pacific War Council in London.

With allied victories in 1943-44, however, there came the inevitable return to traditional policies of concentration on domestic affairs, such as social security, and an emphasis on A.'s Pacific imperialism, notwithstanding developments in international arrangements in which she might play her part. Australian Pacific war policy was, however, affected

by America's attitude towards 'Colonial Trusteeship' (q.v.), in which there were obvious differences of outlook between the Brit. colonial system and Amer. views on 'Brit. Imperialism.' It being evident in 1943-44 that the 'Colonial Question' might produce a conflict among the Allies, A. turned her back on Labour Isolationism, inclined still more strongly to Pacific Imperialism, and stressed the Brit. connection and Britain's influence on the fortunes of the war. This broadened conception of international matters led in 1943 to the appointment by the king, on the advice of his Australian ministers, of the duke of Gloucester as governor-general of A., while in May 1944 Mr. Curtin on a visit to England tried to improve the machinery of consultation and co-operation between the Brit. peoples by proposing the establishment of a Conference of Dominion Prime Ministers, thus reverting to Alfred Deakin's suggested Empire Secretariat; but his proposals were opposed by the other dominions and, consequently, rejected.

*The Arts.*—Percy Grainger, the Australian musical composer, has achieved international fame, as have the singers Dame Nellie Melba, Florence Austral, and Peter Dawson. Appreciation of music and drama is stimulated by broadcasts from the national stations of the broadcasting commission and commercial transmitters. In painting no national school has yet evolved, but the work of such artists as Tom Roberts, George Lambert, Elioeth Gruner, Margaret Preston, and others is laying a foundation. In portraiture William Dobell is noteworthy, and Will Dyson and Norman Lindsay have gained a reputation for black and white art outside their own country. Every state cap. has its national art gallery and also a state art school. Through the munificent Felton Bequest, the National Gallery of Victoria (now one of the richest-endowed galleries in the world) has laid the foundations of a great collection.

*Literature.*—The social hist. of A., from 1788 until the present day, has impressed itself upon the literature of the country: convict foundation, pastoral expansion, gold rushes, bushranging, national self-consciousness, war—these are salient aspects of Australian experience which provide much of the substance and character of Australian literature. At first penal conditions, and then arduous pioneering activity, dominated the colonial scene. It was, moreover, a very different scene, physically and mentally, from the Brit. Is. which the settlers had left. A. was a crude and rugged virgin wilderness, devoid of the N. traditions, a place that could only gradually pass from strangeness to familiarity in the soul of a N. stock. Among literary pioneers were Michael Massey Robinson, a transported convict, Barron Field, supreme court judge, and William Charles Wentworth, notable during formative stages of social and legislative growth in New S. Wales. *Australia, an Ode*, by Wentworth, written in a Cambridge Univ. prize com-

petition, seems to have been the first poem pub. by a native-born Australian. It must be said that, apart from factual books, such as those of Watkin Tench and William Collins, eye-witness accounts of settlement, little that has intrinsic, as well as historical, value was written either in verse or prose in or of A. before the middle of the nineteenth century.

During the second half of the nineteenth century, poets and writers of fiction began to produce impressions of the new land and life in it. Charles Harpur (1813-68) was the first poet to show moments of distinction. Henry Kendall (1841-82), a nature poet, wrote much musical verse with a bush setting, and some poignant sentimental lyrics. Adam Lindsay Gordon (1853-70) wrote ballads richly flavoured with stories of sporting prowess and one, *The Sick Stockrider*, which, in spite of sentimentality and technical defects, is the first significant achievement in Australian balladry. His *Wolf and Hound* is also known to all Australians. His name has survived in Australian literature, though he was a Brit. Australian who was never acclimatised to his adopted country, and his other chief poems, *Briarcliff* and *How we beat the Favourite*, are Eng. in sentiment and colour. It was not until Henry Kingsley (1830-78) wrote *The Recollections of Henry Hamlyn* (1859) that the life of the country was portrayed in fiction of any enduring quality. This was followed by what has come to be regarded as the classic of the convict era, *For the Term of his Natural Life* (1874) by Marcus Clarke (1846-81). Into the story the author infuses such intense drama of human suffering and endurance, heroism and baseness, that, improbabilities notwithstanding, it leaves an impression of emotional vastness. Bushranging is the chief theme of *Robbery under Arms* (1888) by Rolf Boldrewood (Thomas Alexander Browne) (1826-1915), whose scene is set in the goldfields of Victoria. Also full of spirited adventure are his *Squatter's Dream* and *The Miner's Right*.

The most widely read of the late nineteenth- and early twentieth-century poets are Andrew Barton ('Banjo') Paterson (1864-1919) and Henry Lawson (1867-1922). Paterson and Lawson are generally associated, both being of the *Bulletin* school. They and others began to write ballads of mining camps, droving, and the pursuits of the countryside, as well as, in the case of Lawson, ballads set in the city, dealing mostly with the unfortunate lot of the underdog. Bernard O'Dowd, the most intellectual of Australian poets, wrote *The Silent Land* (1906) and *The Bush* (1912), the latter a long poem of aspiration for the future of his country. This was the period when the *Bulletin*, famous Sydney jour., fostered a variety of local talent; it was the period immediately preceding the political federation of the colonies, when Australians were achieving their first vivid sense of nationhood. Technical flaws are frequent in the writings of the school, but now for the first time Australian literature acquired

a sense of unmistakable, if immature, body and character. A. G. Stephens was for many years editor of the *Bulletin* literary page, contributing much by his advice and criticism to literary development during that period. Other poets of this period include: Brunton Stephens (1835-1901), who settled in Queensland, was a Gov. office clerk, and wrote A's patriotic song, *The Dominion of Australia* (but his most notable work is *Convict Once* (1871), a poem of psychological insight); Barcroft Boake (1866-92), a true Australian in outlook whose best-known poem is *A Vision Out West*; Victor James Daley (1858-1905), whose most graceful verse is collected in *At Dawn and Dusk* (1898) and *Wine and Roses* (1911); E. J. Brady, whose *The Ways of Many Waters* is his best poem; C. J. Dennis, racy and slangy, whose poems betray the influence of the Fr. symbolists; Hugh McCrae, writer of verse of a puckish fancy; Roderic Quinn, whose poems are characterised by a Celtic subtlety; David McKee Wright, whose *An Irish Heart* has some pleasing lyrics; Shaw Neilson, a Wordsworthian follower; Zora Cross, sonneteer; and Dorothea Mackellar, whose lyric *My Country* is typically Australian in sentiment. Collected poems by Harley Mathews on Australian soldiers in the First World War, under the title of *Vintage*, appeared in 1938. Yet other poets of the present century, whose writings may be found in anthologies, are Christopher Brennan, Fumley Maurice (Frank Willmot), William Balyebbridge, Mary Gilmore, Leon Gellert, Kenneth Slessor, and Robert D. Fitzgerald. The talent of all these writers, their interests and their expression, are varied. Brennan's work is marked by its scholarship; Dennis, as 'the laureate of the larrikin', won great popularity during the First World War, *The Songs of a Sentimental Bloke* (1915) becoming favourite reading in the trenches. A war poet, too, of some distinction was Gellert.

In prose fiction of the present century names generally recognised as important are: Henry Handel Richardson (Mrs. J. G. Robertson) (see RICHARDSON, HENRY HANDEL), whose trilogy *The Fortunes of Richard Mahony* (1917, 1925, and 1928), an historical and psychological novel, is assuredly the most considerable work of Australian fiction in scope, characterisation, and construction; Mrs. Aeneas Gunn, authoress of *The Little Black Princess* and *We of the Never-Never* stories of the N. back blocks; Katharine Susannah Prichard, who has written stories of aboriginal life and timber-felling in W. A.; Miles Franklin, authoress of the precocious novel *My Brilliant Career* (1901), in revolt against the repressive influences of Australian country life as she knew it, and of *All That Swagger* (1936), a novel of outback pioneering. The last-named novel and *The Mittenfarts* (1928) by Martin Boyd (Martin Mills) and *A House is Built* (1929) by M. Barnard Eldershaw (the partnership of M. Barnard and F. Eldershaw), and *Landmakers* (1934) by Brian Penton are notable additions to the school of historical fiction in A. Eleanor Dark's

*The Timeless Land* (1941) is a *tour de force* in Australian literary self-realisation. *To-morrow and To-morrow* by M. Barnard Eldershaw (1947) presents a convincing picture of the years of boom and depression following the First World War.

The novel of Australian city life found its first assured impulse in many novels by a woman writer, Mrs. Campbell Praed, in the late nineteenth century. Her delineations of Brisbane society and political intrigue have, however, historical rather than literary interest. Louis Stone's *Jonah* (1911) is a unique story of the larrikin element of the Sydney slums. Turning from the novel proper, we may note the significance of such publications as *Such is Life* (1903) by Tom Collins; the true life stories of the N. Ter. of Mrs. Aeneas Gunn; *The Vanished Tribes* (1929) by James Devaney; and *Manshy* (1931) and *The Wells of Beersheba* (1933) by Frank Dalby Davison, the last-named being a moving account of the Australian Light Horse in Palestine.

In the sphere of short stories Henry Lawson (see above) showed talent as well as in sketches of life about the mines and shearing sheds—notably in the vols. *While the Billy Boils* and *Joe Wilson and his Mates*. Other short-story writers include: Louis Becke (George Lewis Becke) (1855-1913); Barbara Baynton, whose *Bush Studies* reflect the stark side of this life with some dramatic power; Gavin Casey, writer of W. Australian gold-mine stories; Peter Cowan, noted for bush stories of a psychological quality; Katharine Susannah Prichard (see above); Albert Dornington (b. 1871) and Robert S. Close.

The period of the Second World War saw a resurgence of Australian poetry, when many new names appeared, including Paul L. Grano, Rex Ingamells, and Flexmore Hudson. Two 'movements' which contributed much to this development are the Jindyworobaks and the Angry Penguins, the first with the aboriginal name, concentrating on indigenous themes, the second openly flouting the accepted conventions of 'romantic' literature. Following the pioneer work of Louis Esson and Vance Palmer, who wrote stage plays earlier in the century, such playwrights as Dymphna Cusack, Betty Roland, George Linden Dann, and others have pub. plays which hold out some promise for Australian drama.

Essays and belles-lettres are the natural outcome of literary development, and A. has so far contributed little in this sphere, the most notable works being the various vols. of essays by Walter Murdoch, *Unscientific Essays*; by Frederick Wood Jones, *Fourteen Minutes*; and *An Outline of Australian Literature* by H. M. Green, *Six Australian Poets* by T. Inglis Moore, *Creative Writing in Australia* by John K. Ewers, *Literary Particles* by R. G. Howarth, and *Singing to the Cattle* by Brian Elliott.

There are a number of anthologies of Australian verse which give a useful view of general achievement, and among these may be mentioned: *The Oxford Book of*

*Australasian Verse* ed. by Walter Murdoch, *An Anthology of Australian Poetry* ed. by Percival Serle and Fumley Maurice, *Modern Australian Poetry* ed. by H. M. Green, *Poets of Australia* ed. by George Mackaness, *New Song in an Old Land* ed. by Rex Ingamells. An anthology of verse by Australian servicemen of the Second World War is *Poets at War* compiled by Ian Mudie.

Outstanding Australian books for children are, in prose, the *Billabong* books of Mary Grant Bruce, *Seven Little Australians* by Ethel Turner and *The Magic Pudding* by Norman Lindsay, and, in verse, *A Book for Kids* by C. J. Dennis.

PERIODICALS: The *Sydney Bulletin* is a weekly journal which has had a strong influence on the development of Australian literature for more than half a century. Two modern periodicals performing a useful function in providing media for literary discussion are *Southerly*, the jour. of the Eng. Association of New S. Wales, and *Meanjin*, both pub. quarterly. *The Australian Quarterly*, pub. in Canberra, has articles on literary, economic, and political subjects. Ann. literary publications are *Coast to Coast* (short stories), *Australian Poetry*, and *Jindy-worobak Anthology*.

Consult: HISTORY AND BIOGRAPHY: G. Arnold Wood, *The Discovery of Australia*, 1922; Walter Murdoch, *Alfred Deakin*, 1923; Ernest Scott, *A Short History of Australia*, 1927, and *The Life of Matthew Flinders*, 1914; Arthur W. Jose, *The History of Australia*, 1929; W. K. Hancock, *Australia*, 1930; *The Cambridge History of the British Empire*, vol. vii, Part I, 1933; Fred Johns, *An Australian Biographical Dictionary*, 1934; S. H. Roberts, *The Squatting Age in Australia*, 1935-47, 1935; George Mackaness, *Admiral Arthur Phillip*, 1937; H. V. Evatt, *Rum Rebellion: Oerthrow of Governor Bligh*, 1938; C. H. Grattan, *Introducing Australia*, 1947. EXPLORATION: E. Favenc, *Explorers of Australia*, 1908; E. Scott, *Australian Discovery: Exploration by Land and Sea*, 1929, and *Terre Napoléon*, 1910; R. Logan Jack, *Northmost Australia*, 1921; J. C. Beaglehole, *The Exploration of the Pacific*, 1934; C. T. Madigan, *Central Australia*, 1936. THE ABORIGINES: Sir Baldwin Spencer and F. J. Gillen, *The Native Tribes of Central Australia*, 1899; Gerald C. Wheeler, *The Tribe*, 1910; G. Horne and G. Alison, *Savage Life in Central Australia*, 1924; Geza Rohelm, *Australian Totemism*, 1925; Herbert Basedow, *The Australian Aboriginal*, 1929; W. Ramsay Smith, *Myths and Legends of the Australian Aborigines*, 1930; M. F. Ashley-Montague, *Coming into Being Among the Australian Aborigines*, 1937; A. P. Elkin, *The Australian Aborigines*, 1938; Daisy Bates, *The Passing of the Aborigines*, 1940. ECONOMICS: D. B. Copland, *The Australian Economy*, 1933; E. O. G. Shann, *An Economic History of Australia*, 1935; F. R. E. Mauldon, *The Economics of Australian Coal*, 1929; G. Taylor, *Australia: A Study of Warm Environments and their Effect on British Settlement*, 1940; *The Economic*

*Record*, a half-yearly publication. NATURAL HISTORY: J. A. Leach, *Australian Nature Studies*, 1922; Neville W. Cayley, *What Bird is that?*, 1931; G. A. Waterhouse, *The Butterflies of Australia*, 1914; K. C. McKeown, *Insect Wonders of Australia*, 1935; T. G. Roughley, *Fishes of Australia and Wonders of the Great Barrier Reef*, 1936; T. Y. Harris, *Wild Flowers of Australia*, 1938; W. Russell Grimwade, *The Anthography of the Australian Eucalypt*; Charles Barrett, *Koonwarra*, 1939, and *Australian Wild Life*, 1943; Ellis Troughton, *Furred Animals of Australia*, 1941. GENERAL: *The Australian Encyclopædia*, 2 vols., 1925; Thomas Wood, *Cobbers*, 1936; William Hatfield, *Australia through the Windscreen*, 1936; Frank Clune, *Roaming around Australia*, 1936; C. P. Conigrave, *Walkabout*, 1938; Ion L. Idriess, *Forty Fathoms Deep*, 1938, and *Madman's Island*, 1939; M. Barnard Eldershaw, *My Australia*, 1939; Arnold Haskell, *Waltzing Matilda*, 1940; Sidney J. Baker, *The Australian Language*, 1945; G. V. Portus, *Britain and Australia*, 1946; I. Douglas, *Opportunity in Australia*, 1947. BIBLIOGRAPHY: J. A. Ferguson, *Bibliography of Australia*, vol. i., 1784-1830; vol. ii., 1831-38; Percival Serle, *A Bibliography of Australian Poetry and Verse*, 1940; E. Morris Miller, *Australian Literature, 1810-1938*, 2 vols., 1942; *Annual Catalogue of Australian Publications*, pub. annually from 1936 by the Commonwealth National Library, Canberra.

**Australia Day**, Jan. 26, the anniversary of the foundation of Sydney, New S. Wales, in 1788 by Capt. Arthur Phillip.

**Australia House**, Strand, London, was erected, 1911-14, by the Gov. of the Commonwealth of A. as offices for their high commissioner and agents-general for Victoria and Tasmania. It was opened in 1918.

**Australian Alps**, a mt. range in the E. highlands of Australia, extending for about 300 m. through Victoria and New S. Wales in a N.E. direction, and forming a continuation of the Great Dividing Range. The chief peaks are Mt. Kosciuszko (7328 ft.), Mt. Townsend (7260 ft.), Mt. Bogong (6508 ft.), and Mts. Feather-top and Buller. The mts. are mostly well wooded and seldom attain the snowline.

**Australian Bight**, Great, a 1600-m. stretch of ocean S. of Australia and extending from Cape Arid in W. Australia to the Eyre Peninsula in S. Australia.

**Australian Commonwealth**, the federal union of New S. Wales, Victoria, S. Australia, Queensland, Tasmania, and W. Australia, constituted by proclamation on Sept. 17, 1900, under an Act of Parliament dated July 1900, which came into existence on Jan. 1, 1901. See AUSTRALIA.

**Australian Flights**, see AERONAUTICS.

**Australian Magpie**, see PIPING CROW.

**Austrasia**, the E. portion of the Frankish kingdom, included Belgium, Lorraine, and the r. b. of the Rhine. The cap. was at Metz. Founded in 511, it was ruled until the eighth century by the Merovingian kings. After Charlemagne's death it was merged into Germany.

**Austregisille, St.** (551-624), popularly known as St. Austrille or St. Otrulle, after serving at the court of Gontran, king of Burgundy, took holy orders and subsequently became archbishop of Bourges, his native place. His remains, exhumed in 1334, were burnt in the sixteenth century by the Protestants.

**Austremoine, or Stremonius, St.,** apostle of Auvergne in third century. He introduced Christianity into Issoire, and the church of St. Paul there is on the site of an older chapel built over his tomb. He was the first bishop of Clermont-Ferrand, and founded the abbey of St. Allys.

**Austria,** a country of central Europe. Prior to the First World War it was an integral part of the Austro-Hungarian or dual monarchy. A. then comprised Bohemia, Moravia, Upper A., Lower A., Salzburg, Styria, Tyrol, Carinthia, Carniola, Istria, Dalmatia, Vorarlberg, Silesia, Galicia, and Bukovina. When, in 1918, Hungary declared its independence and the independent state of Czechoslovakia was constituted, A. expressed a desire to attach itself to Germany, but this was prohibited by the Allies, and, in 1920, Ger.-speaking A. was declared to be a federal republic of 8 provs. and the City of Vienna. These provs. were Lower A., Upper A., Salzburg, Styria, Carinthia, Tyrol, Vorarlberg, and Burgenland, the combined area being 32,400 sq. m., and the pop. (1924) about 6½ millions. After 1919 there were tentative moves for closer association with Germany. A customs union was negotiated during the Brüning administration in Germany, but fell through owing to opposition by France and Britain on treaty grounds. But when the National Socialist (Nazi) party assumed control in 1933-34 in Germany, the Gov. and the Nazi party openly agitated for union, and, later, an Austro-Ger. agreement was concluded by which Austrian independence was recognised conditionally on her policy being assimilated to that of Germany. In 1938 a new agreement was made, under which authority was to all intents and purposes transferred to Germany, and, in Mar. of that year, Ger. troops occupied A. without meeting resistance, and the republic was formally annexed and renamed Ostmark. In Oct. 1938 the Sudeten dists. of Bohemia (a part of the old Austrian Empire) were surrendered to Germany by Czechoslovakia, of which they had formed part since 1918; and parts of the surrendered area were attached to Ostmark and Bavaria, while the remainder was constituted a separate gov., with its cap. at Reichenberg.

**The Austro-Hungarian Monarchy or A.-Hungary.**—The old Austro-Hungarian monarchy, or dual monarchy, as it existed prior to the autumn of 1918, comprised a total area of 240,456 sq. m. and, with the exception of Russia, was the largest separate state in Europe. It possessed, however, only 300 m. of coast line, all on the Adriatic Sea. The bordering countries were Italy, Switzerland,

Bavaria, Saxony, Prussia, Rumania, Serbia, Montenegro; and the aggregate pop. before the First World War was estimated at 51,250,000, made up of 12,000,000 Gers., 10,000,000 Magyars, 8,400,000 Czechs, 5,000,000 Poles, 4,000,000 Ruthenians, 3,700,000 Serbs, 3,200,000 Rumanians, 2,240,000 Jews, 1,250,000 Slovenes, and 770,000 Its. This pop. was unevenly scattered. The districts to the S.E. and those of the N.W. were, and are, the most thickly populated, while the Alpine regions and those of the Carpathians were, and are, the most sparsely inhabited. It was essentially the great diversity of races in A.-Hungary, especially in A., that led to the speedy disruption of the monarchy after the collapse of the Austrian and Hungarian armies. The most numerous race of the races embodied in the Austrian peoples before 1918 were the Slavs, who formed most of the inhab. of Bohemia, Moravia, Carniola, Dalmatia, Croatia, Slavonia, and Galicia. They were divided into the Czechs or Bohemians, the Ruthenians, and the Poles. The Gers. formed about a quarter of the whole pop., and inhabited chiefly A., Salzburg, Tyrol, Styria, Carinthia, and the W. of Hungary. Other inhab. were the Romance peoples (those speaking Rom. languages), of whom there are W. and E. classes. The W. are Its., Lats., and Friulians, the E. are Rumanians. The Magyars are located chiefly in Hungary and Transylvania.

The name Austria is derived from Osterreich, and means eastern kingdom. Though the old empire was formed by the union of the 2 countries under 1 crown, the administration of the 2 countries was separately recognised and, will be seen by reference to the hist. of A., Hungary agitated for a separate political existence over 70 years ago, the *Ausgleich* of 1867 being no more than a compromise based chiefly on commercial considerations. At the close of hostilities in the First World War, both A. and Hungary became separate independent republics and, on the principle of self-determination, a number of the constituent races, either singly or in combination, grouped themselves into independent sovereign states or were voluntarily incorporated in existing states. Thus, the Serbs, Croats, and Slovenes (Bosnia, Herzegovina, Montenegro, and Serbia) combined to form the kingdom of Yugoslavia; the Czechs and Bohemians proclaimed Bohemia, Moravia, Silesia, and Slovakia to be a new republic—Czechoslovakia; the Galician Poles became incorporated in the restored Polish state; while Transylvania was ceded to Rumania and the Ukrainians became one of the constituent states of the Union of Socialist Soviet Republics. (See also CZECHOSLOVAKIA; POLAND; RUMANIA; RUSSIA; YUGOSLAVIA.)

**Physical Features and Productions of pre-war A.**—Most of the surface of A. is mountainous, being crossed by Alpine ranges. The highest points are in the Noric Alps, which, with the Rhaetian Alps, extend from Switzerland

to the Danube. In this system is Ortler Spitze, 12,814 ft. (q.v.). Some famous mt. passes are the Stelvio, 9240 ft., leading to the Swiss Engadine, the highest pass in Europe; the Brenner Pass, 4600 ft., in the Rhetian Alps from Innsbruck to Botzen; the Semmering Pass, 3250 ft., in the Styrian Alps, between Neustadt and Graz, and the Grossglocknerstrasse across the Hohe Tauern from Zell-am-See to Heiligenblut. Of rivers that have navigable tribs. all that is left to A. is a part of the Danube from near Passau through Linz to Vienna, with the trib. Inn; but the Rhine flows for about 25 m. of its course between A. and Switzerland.

In its pre-war amplitude A. was ill supplied with canals, but still retains the chief, the Vienna-Neustadt canal, which in Lower A. has a length of 40 m.

The climate of A. is favourable. Generally speaking, Vienna, with about the same average temp. as London, has a much warmer summer and a more severe winter than the latter city. The rainfall of the Alpine district is excessive, reaching 60 in.

Regarding the mineral wealth, no European country could, before the First World War, boast more prolific resources than A., though Russia had gained the ascendancy over the output of gold and silver. Large quantities of lignite and anthracite are mined. Copper, zinc, and lead are also produced. In their output of minerals, Styria, Carinthia, Salzburg, and the Tyrol are, in that order, the leading provs., but are inferior to Hungary and Bohemia in that respect. There are gold dists. in Salzburg and Tyrol, and silver is also mined there. Mercury is found in Styria and Carinthia; zinc and lead in Carinthia; iron in nearly every prov., though most of it is mined in Styria, Carinthia, and Carniola. Arsenic, cobalt, sulphur, and graphite are also worked. Building stone, gypsum, and marble are quarried in profuse quantity. A feature of the mineral production of old A. was the salt output, produced by the evaporation of salt spring-water.

Agriculture is still, however, the principal occupation of the people of A. Half the total acreage is in Upper and Lower A. The chief crops are wheat, rye, barley, oats, potatoes, and turnips; but, although the country is predominantly agric., the foodstuffs produced were insufficient to meet the requirements of the pop. There is a fair output of raw sugar, and also of live-stock. Tobacco and hops are also raised, and a profusion of fruit is found in the orchards of Upper and Lower A. and the Tyrol. Cider in large quantities is made in Upper A. and Carinthia. Wine production, though small in comparison with that of Hungary, is cultivated in most of the provs., except Upper A. The forests offer many opportunities for the timber trade, among the chief secondary products being tar, potash, charcoal, bark, and cork.

The animals found in A. include bears, chamois, and wild goats in the Alpine dists. There is an abundance of fish in the Danube.

Plano-making, the manuf. of automobiles, furniture, and textiles represent the only industries of importance in old A. Tobacco enjoyed a monopoly and the ann. output of cigars, cigarettes, and smoking tobacco was great. The most important article of vll. industry is silk, Tyrol being the centre; but the rise of artificial silk injured the trade. Before the Second World War A. had 4160 m. of railway lines, most of which were operated by the State. After the peace treaty of 1919 the Austrian Army was reduced to 30,000 men, organised in mixed brigades; while the former Austro-Hungarian fleet ceased to exist.



Paul Popper

#### AUSTRIAN IN NATIONAL DRESS

*Hist. of A. before the War of 1914-18.*—The earliest known inhab. of A. were a Celtic tribe called Taurisci, who were succeeded by the Norici. In 14 B.C. the Romans conquered the Norici, and the ter. N. of the Danube passed into the hands of the Marcomanni, while to the S. were situated Noricum and Pannonia, 2 Rom. provs., in the latter of which lay Vindobona, now Vienna. At this time Tyrol formed part of Rhetia. An invasion of the Boii in the fifth century destroyed these boundaries, and a period of constant warfare and contention saw the succeeding occupations of the Vandals, Goths, Huns, Lombards, and Avars. Subsequently the Lombards settled in Italy, and the R. Enns now formed a div. between the Avars on the one side, with the Slavians on the other. In 796 Charlemagne conquered the Avars, and in order securely to hold his position there, estab. the E. Mark. It is from this ter. that the Austrian empire definitely

traces its origin and development. Shortly, however, it suffered almost complete obliteration at the hands of the Hungarians, who did not long profit by their success, for in 955 Otto the Great defeated them at the battle of Augsburg, thus restoring the E. Mark to the Gers. Later, in 983, he invested Leopold of Babenberg with the title of margrave. Under the Babenbergs the dominion received considerable enlargement of ter. and development of its internal strength. Indeed, the whole progress of the Austrian empire may be said to be due to this great and powerful house, and to the succeeding dynasty of the Hapsburgs. Between 1141 and 1177 2 dists., the E. Mark and the Lower Mark, i.e. the ter. lying below the Enns, were united into a dukedom under Henry Jasomirgott, who became the duke of the newly formed duchy. To Jasomirgott Vienna owes to a certain degree its foundation. He also participated in the second crusade. The duchy became much extended as a result of the efforts of his successors, while the title of the greatest of their house can be assigned to Leopold VI., whose sev. and successful campaigns directed against the Hungarians and Mussulmans earned him considerable distinction. In 1246 his successor, Frederick, d. in an engagement with the Magyars, at which event the famous house ceased to exist.

For a time the country was without a ruler, and in the confusion that followed, A., to which had been added Styria, supported their choice of Ottakar of Bohemia, but he opposed the imperial control of Rudolf of Hapsburg, and met his death during the battle of the Marchfeld, 1278. The emperor passed the ter. to the hands of his 2 sons, Rudolf and Albert, but shortly afterwards it was left to the sole possession of Albert, who now held A., Styria, and Carinthia. The great administration of the Hapsburg line now began. In the midst of his vigorous restoration of order in a country chaotic in its condition, Albert was murdered by his own nephew. In 1322 Louis of Bavaria defeated Frederick, one of Albert's 5 sons, in his attempts to succeed to the dukedom. Meanwhile the Swiss, in 1315, had revolted against Leopold, who suffered defeat. Albert III. in 1330 succeeded, and to a considerable extent expanded the duchy. He was succeeded by Rudolf and Albert II. respectively, and in the latter's reign Tyrol was added to the Austrian boundaries. Albert IV. assumed the reins of control, and his son, Albert V., by marrying the daughter of the Emperor Sigismund, succeeded to the ownership of Hungary and Bohemia. He now became Ger. emperor as Albert II. The possession of these 2 additional countries did not last long, for shortly after his death they were lost again, though the title of Ger. emperor remained with the Austrian monarch, now Ladislaus, son of Albert II. The death of Albert had changed the line to the Styrian side, in which dynasty rose Frederick III. He added to the importance of the country

by giving it the rank of an archduchy. The Austrian lands now passed into Frederick's hands, owing to the close of the Austrian house. In 1493 Maximilian I., his son, succeeded him.

From this reign it can safely be said that the Austrian empire under the Hapsburgs began suddenly and powerfully to gain in power and position. By a series of shrewd marriages the dominions leapt to the position of the greatest empire in the world. Maximilian himself married Mary, daughter of Charles the Bold, thereby acquiring the Netherlands. Phillip, their son, married Joanna of Spain. Phillip died in 1506, and his son, Charles V., inheriting the united countries, became emperor of Germany; but he passed his Ger. possessions to his brother, Ferdinand I., the continuation of the Austrian branch. Under his reign A. considerably gained, not the least significant circumstance being that which rendered A. the centre of Christian strength in E. Europe against the Turks. He now claimed Bohemia and Hungary on the death of Louis, whose sister he had married. In Hungary his claim was opposed by John Zapolya. With the aid of the formidable Sultan Soliman, Zapolya invaded Hungary with success until he reached Vienna. The tn. was besieged, but unsuccessfully, in 1539. Till nearly the end of the seventeenth century only a small portion of Upper Hungary remained in A.'s possession, Turkey holding the remainder. Ferdinand succeeded to the title of Ger. emperor when Charles V. abdicated the imperial throne, and d. in 1564. To him the Jesuits owed a great deal of support, notwithstanding the existence, during Ferdinand's reign, of strong conservative tendencies.

Of his 3 sons, the eldest, Maximilian II., inherited the crown of Germany, together with A., Hungary, and Bohemia; Ferdinand, the second son, received Tyrol and Upper A.; Charles, Styria and Carinthia. Maximilian's love of peace received gratification in a truce with the Turks, following the death of the famous Soliman. His eldest son, Rudolf, was crowned king of Hungary and Bohemia. Just and temperate as a ruler, tolerant in religion, Maximilian closed his reign in 1576. He was succeeded by Rudolf II., who became emperor, in whose reign the Jesuits prospered to a great degree, owing mainly to the apathy of the king, who left all his affairs in hands only too willing to control them. So bitter was the persecution of the Protestants that he was forced to concede a charter of religious liberty. Later he was compelled to surrender Hungary, Bohemia, and A. to his brother Matthias, 1612, who in turn ceded Bohemia and Hungary to his cousin Ferdinand, who was the third son of Maximilian II. He was succeeded by Ferdinand II., whose rule was ignored by the Bohemians. Instead, they nominated the elector palatine, Frederick V., the chief power behind the Protestant union. The Thirty Years war resulted, A., determined to support the cause of



Catholicism and fired with the desire to establish a dominance of the Ger. empire, acted a prominent part. At the battle of Prague, 1620, Ferdinand was victorious, and Bohemia was subjected to his rule. A severe and bitter persecution of the Protestants followed. Under his successor, Ferdinand III., the war continued, and in 1648, at the peace of Westphalia, he had to cede Alsace to France. A period of unrest, due to the severity of his successor, Leopold I., led to the crippling of Turkish power in Hungary, culminating in their final expulsion in 1690, at the treaty of Carlowitz. Leopold and Louis XIV. now struggled together over their claims to Spain. The war of the Spanish Succession followed, in the midst of which Leopold died. Noticeable in his reign was the growing influence and strength of the Jesuits, whose formidable power had never before reached such a height. Their rise was nourished chiefly, as in the case of Rudolf II., upon the lack of energy and need for active interest on the part of Leopold.

The war was carried on by Joseph I., who, dying without issue, was succeeded by his brother, Charles VI., in 1711. The war was concluded in 1714 by the treaty of Rastadt. By it A. gained the Netherlands, Milan, Naples, Mantua, and Sicily. Prince Eugene, by his brilliant victories over the Turks, forced them to accept the treaty of Passarowitz in 1718, by the terms of which they were completely driven from Hungary. The advantages from these victories, however, were of short duration, for, by the peace of Belgrade, that fortress and former conquests were restored to them. In 1740 the male line of the Hapsburgs became extinct, the succession being vested in the person of Maria Theresa. To this remarkable woman the practical unification of the Austrian state may be attributed. Moreover, it was during this reign that the old order of gov. with its conservatism and its lifeless monotony was changed for the beginnings of modern methods.

Immediately following the death of Charles VI. the European powers sought to take the advantage of a female ruler. Under the Pragmatic Sanction they had promised Charles to support her rule, but the atmosphere of the age was not conducive to honourable observance of oaths, and Maria Theresa found herself facing Europe. England alone stood by her. During the war Frederick II. of Prussia conquered Silesia. The elector of Bavaria was crowned king of Bohemia and elected emperor as Charles VII. in 1742. Supported still by the Hungarians, Maria Theresa, undaunted, managed against her numerous enemies practically to hold her own. At the peace of Aix-la-Chapelle, 1748, A. remained almost intact. Charles VII. *d.* in 1745, and Maria Theresa's husband, formerly the duke of Lorraine, was elected emperor of Germany as Francis I. Maria now saw that France was to be feared no longer as her most formidable enemy. In 1756 the treaty of Versailles was concluded, in which the long rivalry between the Hapsburgs and

the Bourbons came to an end. Chafing at the loss of Silesia, Maria, with the aid of France, Russia, Saxony, and Sweden, moved against Frederick of Prussia.

The Seven Years war ensued, at the end of which the Prussians still held Silesia. Joseph II. became Ger. emperor on the death of his father, Francis, holding with his mother the monarchical reins. In 1780 Maria Theresa *d.*

Relieved of the wise and restraining influence of his mother, Joseph's reign was characterized by a spirit of violent and ill-considered reform. Discontent, roused by the sweeping nature of his sudden changes, fermented in Hungary and the Netherlands, in the midst of which turmoil he *d.*, 1790, after being forced to reverse his entire policy of reformation. He was succeeded by his brother, Leopold II., who was successful in restoring peace with the Netherlands and Hungary. The fate of Marie Antoinette, his sister, and her husband, Louis XVI., led Leopold II. to ally himself with Prussia against France, an alliance which was disturbed by his death in 1792. No time was lost, however, for France immediately declared war on his son, Francis II.

During this reign the foreign policy of A. owed most of its adoption and execution to Metternich. Francis II. possessed few qualities calculated to suit the disturbing elements prevalent in A. when he succeeded to the throne. A consuming love of detail, added to a zest for thoroughness exacting to a painful and stifling degree, led to a gradual decay of all responsibility on the part of his ministers. Metternich, conscious of the disease, knew that its existence was due only to listlessness in the minds of the nation.

In 1797 France secured Lombardy and the Netherlands. Two years later Francis II. united forces with Russia, and the Austrian borders underwent many changes till 1804, when Francis, anxious to prevent an indignity to his country, in the event of Napoleon demanding its subordination, abandoned the title of Ger. Emperor, and adopted that of hereditary emperor of A. as Francis I. In 1809 the peace of Vienna seriously reduced the Austrian ter., after which event Napoleon's marriage with the Archduchess Maria Louisa was shortly announced. Hence, in 1812, A. became an ally of Napoleon, without, however, rendering him any practical assistance. At the battle of Leipzig, 1814, A., joining the Grand Alliance, assisted in the wrecking of Napoleon's power, and in the following year, at the treaty of Vienna, as a recognition of her struggles and vicissitudes, she received Venice and Dalmatia, important gains, on account of the opening thus afforded for her foreign trade. Till 1840 a long peace followed, during which A. became an important factor in determining European politics. She had also allied herself to Russia and Prussia.

Meanwhile, acute dissatisfaction felt and expressed against the rigorous character

of the bureaucratic system of gov. came to a head. Metternich owed his position as a minister to a great extent to the royal favour, and he was unwilling to suggest a reform of which he himself saw the urgent need. In Italy, Hungary, and Bohemia the growing discontent reached a climax, and on the death of Louis Philippe, 1848, revolutionary elements broke out over all Europe. In the crisis Metternich fled to England, and, left in the hands of the populace, the whole system tottered and fell. Austrian power and its gov. lay among the ruins. Chaos followed, the centre of disorder being Vienna. Finally, a check was placed upon the confusion by Prince Windischgrätz, whose energies in the battlefield crushed an attempt at revolt on the part of the Slavs in Prague.

It was in Italy that A. began first to recover herself, for Lombardy was delivered into her power, after a truce with the Sardinians. Affairs meanwhile were going from bad to worse. In Hungary the parliament was dissolved; but in the face of its dissolution it continued to hold meetings. The populace rose and, on the order of the 'dead' parliament to call out the militia, a fresh insurrection was complete. Windischgrätz, however, besieged the cap., which surrendered. A reaction followed, but Ferdinand, who had shown little ability and less readiness during the crisis, was persuaded to abdicate in favour of the young Francis Joseph. Under the direction of Radetzky the reclamation of N. Italy was speedily accomplished, its complete restoration culminating in the surrender of Venice, 1849. In Hungary, however, the Magyars, under Bem, met with more success, and Hungary was reproclaimed a separate state, free from the dominance of the Hapsburgs. Their freedom lasted for only a short time, for Francis Joseph, aided by Russia, completely crushed the Hungarians. The subjugation of Hungary was accomplished. While these operations had been in course of execution, A., keenly alive as ever to its interests, strenuously opposed a projected confederation of states under Prussia, thereby defeating the Prussian king in his wish to become emperor of Germany.

For the next 10 years a policy of bureaucratic gov. was revived, the constitution which had been granted in 1849 being destroyed. In almost every dept. of the gov. a rigorous and merciless system of oppression was followed. The Catholic Church lent its support to the bureaucracy, and, aided by an ally of such power, the lot of Hungary, Italy, and Bohemia became constitutionally insupportable. Intense irritation was felt by them at the ruthlessness which marked the Austrian treatment of the national aspirations. Moreover, Prussia began formidably to contend with A. for ascendancy in the Ger. empire, but the aggressive and determined attitude maintained by A. won her the coveted recognition.

Complication now arose during the Crimean war. Much of A.'s strength

lay in its position with relation to the Balkan Peninsula. This was now threatened, and anxiety concerning the preservation of her own standard of power struggled with feelings of gratitude towards Russia, to whom A. was so indebted. The time, with its uncertainties and its opportunities, became ripe for Italy to assume a threatening front. Austrian administration in Italy had given little satisfaction to the Its., and their national feeling centred in Sardinia. In 1859 Italy prepared for a determined opposition to a rule that cramped its national freedom. Napoleon added his services to the Sardinians with such success that the Austrian emperor was compelled to offer terms of peace. When all was concluded Venice was all that remained of Italy to Austrian control.

Smarting under the humiliation she had suffered, A. was yet again called upon to enter the field. Prussia had not forgotten the arrangement by which A. had become the leading element of the Ger. empire. The protracted rivalry was now brought to a head. During their alliance in expelling the Danes from Schleswig-Holstein, a quarrel arose between the co-operating victors. In 1866 war was declared, and A. suffered heavy defeat at the battle of Sadowa. Prussia now occupied the middle states of Germany which formerly had supported A. At the termination of the struggle A.'s supremacy over Germany was brought to an end, and Sardinia, who had taken the field against her, demanded and obtained the prov. of Venetia. Austrian influence to the W., so long successfully maintained, was now completely broken.

Hungary's claims to be recognised as a separate and distinct country were now, with great advantage, pressed forward. In 1867 its political rights were successful in being regarded as justified. This agreement was the famous *Ausgleich*, which was in force for some time and to a sufficient degree justified its adoption. By the year 1907, however, it became obvious that to exist separately was commercially prejudicial to both countries. Accordingly a 'customs and commercial treaty' was formed involving chiefly the following conditions: (1) Each country was to adopt a separate but identical tariff of customs. (2) Hungary was to facilitate railway communication from Vienna to Dalmatia, while each country bore the responsibility of construction in its own area. (3) A. was to facilitate railway communication between Hungary and Prussia. (4) A court of arbitration was to be formed for the settlement of state differences. (5) Commercial treaties with foreign countries were to be undertaken by separate nominees. After 1867 it became patent that the old system of gov. by bureaucratic methods was an absolute failure, and measures towards a more constitutional freedom were passed. The presence, however, of the many nationalities within its borders rendered the task of settling all claims difficult.

From a different point of consideration, however, the existence of so many conflicting requirements and national tendencies helped valuably to increase the security of the dual monarchy. For without union no significant disturbance could be organised and harmony of action, where the aims were so entirely opposed, it was impossible to establish.

The foreign policy of A. has been to create a tangible understanding with Germany and Russia. With Germany the difficulties were not so great, and from 1879 an informal agreement has existed. Bismarck visited Vienna and arranged a treaty by which Germany bound herself to support A. against Russia, while A.-Hungary promised to assist Germany against a combined attack from France and Russia.

For a time Russia joined the Triple Alliance with A. and Germany, but the question of Russia's aims in the E. made a more definite attitude towards each other difficult of settlement. During the Russo-Turkish war of 1877-78 this feeling was irritated by a decided tendency on the part of the Magyars to sympathise with the Turks. Meanwhile the position was made complicated by the gov. of Bosnia and Herzegovina. While these 2 states were under the direct control of A. her task in fostering them was more than ordinarily an anxious one.

*A.-Hungary in the First World War.*—The international solidarity of the dual monarchy before the First World War was founded largely on the maintenance of the alliance with Germany. The loyalty of the Archduke Francis Ferdinand, nephew of the Emperor Francis Joseph, to this alliance, coupled with his patriotism and administrative ability, rendered the future career of this prince one of peculiar importance to A.-H., more especially as he was credited with being chief protagonist of the policy of incorporating the Bosnian Serbs and the Serbo-Croats into a triple kingdom with A.-H. The archduke was, therefore, anathema to all patriotic Serbs and an obstacle to those dreams of territorial expansion which they had long entertained. Here, then, were the seeds of the gravest of European conflicts; for the Austro-Hungarian Gov. had frankly declared that the existence of the Dual monarchy was really in jeopardy through the intrigues of the Serbs, while at the same time Russia as openly espoused the cause of the Serbs. When, therefore, the archduke and his wife were murdered in the streets of Sarajevo, in June 1914, it became clear that A.-H. would receive the full support of Germany in crushing Serbia, particularly as the Austro-Hungarian Gov. had, a year previously, invited the co-operation of Italy to the same end, at a time when the situation was by no means ripe for drastic action. The occasion now, however, being opportune, matters moved precipitately towards a general European conflagration; for Germany at once recognised in it a favourable combination of circumstances for breaking through the 'iron ring' which

her diplomats imagined, on good or bad grounds, her neighbours were forging round her. There seems to be no doubt, in the light of the memorandum indiscreetly pub. in 1916 by Prince Lichnowsky, Ger. ambas. to London, in which that diplomatist deplored the mistaken policy of his own Gov., that this was the general position in 1914, and that the Ger. Gov. was only too eager to hasten the conflict against Russia and her ally France. Lichnowsky, in fact, saw in A.-H. a nation urged on to its doom by the machinations of its far more redoubtable neighbour. A.-H. sent an ultimatum to Serbia on July 23, and thereafter events moved rapidly. For though the Serbian Gov. undertook to comply with the demands of A.-H., and offered to refer all disputed points to The Hague or to a conference of powers, the Austro-Hungarian Gov. disregarded the reply and mobilised its army. Germany, by insisting that the dispute wholly concerned A.-H. and Serbia, and by opposing the efforts of the future allied powers to get it referred to The Hague, directly promoted not only the Austro-Hungarian plan of destroying Serbia as an independent nation, but inspired the design of wiping out Russian influence in S.E. Europe; and thus within a week of Austria's formal declaration of war against Serbia (July 28) Germany, A.-H., Russia, and France were in a state of war; and this soon involved, through the violation of Belgian neutrality, the intervention of Great Britain. By the end of the first week of Aug., A.-H. had formally declared war against Russia. There being no indication whatever that either of the central powers would make peace separately, the alignment of opposed nations was complete for a general outbreak.

At the very outset, A.-H. had to bear the brunt of the conflict against Russia. This entailed a weakening of her campaign against Serbia on the Bosnian front, besides necessitating the defence of Galicia, which by its natural position was really Russian ter., and also the maintenance of sufficient forces at home against the possibility of the intervention of Italy. Two Austro-Hungarian armies, to the number of 600,000 men, were concentrated in Galicia, based on Przemyśl and Jarosław and on Lemberg. Some initial successes were gained, largely because the Russian plans envisaged an attack on Galicia from the E. The Russian army then retired before the pressure of Gen. Dankl from Russian Poland, but, returning to the offensive, attacked the other Austrian army under Auffenberg, while another Russian army, under Gen. Brusilov, advancing from Kiev, assailed Auffenberg's flank in the Tarnopol quarter. Ruzsky, leading the first Russian army, took Sokal, and Brusilov captured the strong positions of Halicz and Tarnopol, and then turned against Lemberg, while Ruzsky, advancing N. of this city, pierced the Austrian left and threatened Auffenberg's communications. The battle of Lemberg

was fought on Sept. 1-2, and resulted in the capture of the city and of 100,000 prisoners. The advance into Galicia continued, and soon another battle was being fought on a front extending from the Vistula to the Dniester (Sept. 6-10). In this battle the Archduke Joseph was decisively defeated, and the whole Austrian front was routed. This occurred just when the first battle of the Marne was won on the W. front, but the sanguine hopes of the Allies were doomed to frustration, and the 'brilliant second,' supported by her far more powerful ally, was by no means annihilated. The Austro-Hungarian army in the vicinity of Cracow was reorganised by the Gers. and preparations were made for a counter-offensive, which was ultimately launched in Jan. 1915. This counter move failed, and the great fortress of Przemyśl, which had been besieged for 3 weeks, surrendered. The Russians then resumed the offensive previously begun by Brusilov in the Carpathians. Galicia had thus fallen to Russia, and the fate of A.-H. might well have been sealed early in the war but for the transfer by the Ger. High Command of large forces from the W. to the E. front.

With these distractions in Galician Poland—which, as usual, was the cockpit of the nations—the Austrian army, invading Serbia in Aug. 1914, across the Drina, had made but little progress and in a short time were hurled back into their own country. The struggle between the Austrians and the Serbs was never decisive, but Belgrade surrendered in Dec. 1914, after the second advance of the Austrians on Valjevo. Shortly afterwards the Serbians replied by decisively defeating 2 Austrian army corps at Valjevo, driving the Austrians across the Drina and recapturing their cap., which King Peter entered in triumph at the head of his army on Dec. 15. A period of comparative quiet now followed, owing largely to the attitude of Italy, who was making it clear to A.-H. that the 'punishment' of Serbia must not involve damage to It. interests in the Balkans without compensation; and before long Italy was demanding important concessions from A.-H. as the price of her continued neutrality (see ITALY). In Apr. 1915 the It. Gov. demanded of the Austro-Hungarian Gov. the surrender of Trentino, together with the towns of Bozen, Trent, and Rovereto, so as to restore the old boundary of 1811; the extension of her frontier along the Isonzo R. so as to embrace Gorizia, Monfalcone, and other strong positions; the autonomy of Trieste; the cession of certain Dalmatian is.; and the recognition of It. sovereignty over Avlona (g.r.). The rejection of most of these demands followed as a matter of course, and this, added to the It. Gov.'s mistrust of the Ger. Gov.'s guarantee of such concessions as A.-H. was willing to make, led to Italy's denunciation on May 4 of her treaty of alliance with A.-H. and, though A.-H. made a last desperate attempt to buy off Italy with an abject

compliance, at all events on paper, with virtually all the above-mentioned demands, Signor Salandra, the It. premier, broke off further negotiations and gave free rein to It. enthusiasm for the dream of the It. hegemony of the Adriatic to be fulfilled by force of arms. From this point, however, the Austro-Hungarian armies on the E. front, reorganised with amazing skill by the Ger. military authorities, met with better fortune, though it is to be borne in mind that they were threaded through and through with Ger. soldiers. Huge armies of massed Austro-Hungarians and Gers. were now gathered for a tremendous counter-blow in Galicia, while in Hungary 2 Ger. armies, under Gen. Boehm-Ermolli and Gen. von Linsingen, were preparing for a drive against the Carpathian positions. Under the able Ger. general, von Mackensen, their arms met with entire success. The days of the Russian 'steam-roller' were over. Von Mackensen, by dispatching von Linsingen to threaten Stry and Lemberg, kept the Russian command in a state of great uncertainty as to where the blow would fall. From being invaders, the Russians had fallen back on the defensive; Lemberg was soon untenable, and fell on June 22, or only 3 weeks after the fall of Przemyśl. Soon after the Ger. and Austro-Hungarian forces had entered Lemberg, the Russians were in precipitate retreat through the Carpathian passes and all the big fortresses of Galicia had been recovered by Mackensen.

At the beginning of 1916 there was general optimism in Germany. Russia had retreated and the Ger. forces were masters in the Near E. Both Germany and the Allies now tried to obtain a decision, and both failed. But there was this difference—that the failure of the Allies was but transient, whereas that of Germany was really the beginning of a 2 years' process of the gradual decline of the dream of *Mittel-Europa*. Towards the end of 1916, the central powers individually and simultaneously submitted proposals to the diplomatic representatives of the U.S.A., Spain, and Switzerland and other neutrals, to enter into peace negotiations. It is probable that Germany knew that she had reached the zenith of her war conquests, and that the time was ripe for the consolidation of those gains. The Allies rejected the offer on the ground of defect of reparations and guarantees, and, moreover, they had reached the point that their peoples were in a mood only to dictate, not to receive peace terms, nor were they dismayed by the military successes of the central powers, whose ter. was free of invaders and their solidarity intact. This solidarity remained unimpaired throughout 1917, in spite of the intervention of the U.S.A., the effect largely of the defection of Russia. Had the Russian armies been able to continue their pressure against the strung-out lines of the Austro-Hungarian armies from the Sereth to the Baltic Sea, while the Allies on the W. front, the It. armies on the Carso,

and the Army of the Orient in Macedonia took the offensive, the artificial conception of *Mittel-Europa* must have dissolved sooner than it did. But though the Russian revolution, in its earlier stages, seemed to promise some hope to the Allies, it soon became evident that the expectation that it would react on the central empires so as to encourage a continuance of internal disorders, especially in A.-H., to the ultimate disruption of the Germano - Austro - Hungarian alliance, was ill-founded. In the first 6 months of 1917 there was certainly grave turmoil in A.-H. The social upheaval in Russia was not without its effect in betraying, by analogy, the political inequalities of the heterogeneous peoples comprised in the dual monarchy; for in A. alone 10,000,000 to 12,000,000 Gers. overrode twice that number of Slavs, and in Hungary 10,000,000 Magyars dominated an equal number of Slovaks and S. Slavs. Necessarily only the Ger. elements of A. and the Magyars of Hungary acquiesced in the Prussian hegemony in *Mittel-Europa*. Plots and executions of civilians and mutinies occurred. The Czechs and Slovaks were on the point of open rebellion. The seeds of what was destined to be the governing principle of the treaty of Versailles, the principle of self-determination, were being sown among the Serbs and Montenegrins, the Roumans and Ruthenians and other races. The artificial entity of the dual monarchy was thenceforth doomed, though the early hopes of the Allies in that connection were for the time being sorely belied. The Emperor Karl, who succeeded the aged Francis Joseph in 1916, had been advised, as the best means of holding the dual monarchy together, to attempt the conversion of A.-H. into a 4-fold kingdom, consisting of A.-H., Yugoslavia, Poland, and Czechoslovakia; and with ostensible liberality of mind he appointed 2 Czechs, Count Czernin and Count Clam-Martinitz, to the posts of foreign and prime minister respectively in Austria. But the task of compromise as between the Pan-Germanists and the Czechs was too great for either minister. Count Clam-Martinitz, with a show of democratic principle, convened the Reichsrat, which had not met since the war began; but far from pacifying the discordant babel of conflicting nationalities, the assembly of deputies merely provided a convenient platform for still more vehement denunciation of the existing regime. Czech and Yugoslav members alike demanded complete independence, and the premier therefore tried to secure the support of the Poles so as to outvote the rest. The ruse was in vain, for the Poles were as insistent on their own unity and independence as the other 2 races. This political situation was aggravated by the formal indictment of the Hapsburg monarchy by the National Council of Czechs, for bringing on the war without the consent of the Czech members of Parliament, and for various crimes against the Czech soldiers and civilian pop. In July 1917 Dr. Trumbitch, the

leader of the Yugoslavs, signed with M. Pashitch, the veteran premier of Serbia, the celebrated declaration of Corfu, under which the signatories agreed to constitute an independent state comprising Serbia, Montenegro, and the S. Slavs of A.-H. The immediate effect of these events was that Clam-Martinitz gave way to a case-hardened bureaucrat, von Seidler; while in Hungary, Count Tisza, the distinguished Hungarian premier, who had been in office since 1913, was manoeuvred out of his post by a rival group of Magyars under Count Julius Andrássy. These changes, of necessity, were intended to harden resistance to democratic reform and demands for independence, but it was clearly realised by the Emperor Karl that the sole chance of saving the dual monarchy, if any, and of solving the intricate racial problems which now agitated his kingdom, lay in concluding immediate peace with the Allies. Hence, all through these earlier months of 1917, he and Count Czernin were secretly corresponding with the Allies for the conclusion of a separate peace; and in seeking to negotiate with the Fr. Gov. through his relative Prince Sixtus Bourbon, Karl even went so far as to offer his support to Fr. claims in Alsace-Lorraine. The morale of A.-H. was clearly weakening. The Allies, never ill-disposed towards A.-H., endeavoured by every means to wean A.-H. from the Ger. alliance, and the U.S.A., though in a state of war with Germany, refrained from declaring war against A.-H. till the end of the year. Thenceforth only Germany continued to cherish any illusions about the permanence of *Mittel-Europa*; for already Bulgaria was tired of the war, and Turkey had become disintegrated in its Asiatic terrors.

The strange vicissitudes of war, however, kept alive, even in A.-H., the external appearance of a favourable military and political situation. The soil of A.-H. was still free of invaders, the treaty of Brest-Litovsk (*q.v.*) and the treaty of Bucharest (*q.v.*) had released her arms from the Russian and Rumanian fronts respectively, and her forces held Montenegro, most of Serbia and Albania, to say nothing of a large part of N.E. Italy. But within the kingdom the disruptive tendencies noticed above were increasing, and, aggravated by the stringent economic situation, the victories or stories of victories availed nothing against starvation and political disillusionment. Marshal Ludendorff, the chief of staff of the Ger. Army headquarters, was baffled; he intimated unreservedly to the Austro-Hungarian Gov. that he would undertake to try to force an issue on the W. front, but that the effort must be conditional on A.-H. overwhelming Italy. Thus A.-H. was induced to make her supreme and disastrous onslaught against Italy, in the hope of getting that power out of the war by force of arms. A combined strategic plan for breaking through on the Asiago plateau from the Tyrol, in conjunction with a grandiose flanking movement on the Piave, so as to

come right down to the very gates of Venice, was launched. The offensive began in mid-June 1918, but at the end of a few days the It. and Brit. (under the command of Gen. Cavan) forces, commanded by Gen. Diaz, who was fully cognisant of the Austro-Hungarian plan, had assumed the counter-offensive and begun the final blow against the armies of A.-H.

Owing to these internal dissensions, the dual monarchy began to show unmistakable signs of collapse long before the defeat of Bulgaria and Turkey and long before the final allied victory on the W. Front. The position vis-à-vis the various constituent nationalities of A.-H. and the monarchy was like that of a couple of aged parents dominated by a numerous and determined progeny. From covert intrigues the innumerable associations of professional men and peasants and mercantile communities soon proceeded to open propaganda; mutinies in the Austro-Hungarian armies and wholesale desertions from the Czechoslovakian, Yugoslavian, and Polish units to the ranks of the Allies were increasing day by day; loyalty to the Hapsburgs had disappeared; national councils of the various subject nationalities were formed in the great allied camps, and in America. In the early part of 1918, the Poles at length threw in their lot with the other nationalities. Hitherto their sympathies had been undecided, owing to the grant to them by von Seidler in 1916 of the status of a separate kingdom; but when, through Germany's insistence, the Polish ter. of Cholm was handed over to the new Ukraine republic, the incensed Poles joined cause with the other separatists, and even Gen. Pilsudski (q.v.), the Polish national hero and friend of A., led so vehement an agitation against the Teuton influence that he was deported to Germany. Gov. by parliament became nugatory and the Reichsrat was summarily closed by Karl on the advice of his premier, von Seidler, early in 1918. Pan-Slavic congresses had been held in Prague and Agram in the winter of 1917-18. These were followed by the historic Congress of Oppressed Nationalities, convened in Rome in Apr. 1918. The Allies now openly espoused the cause of these nationalities, and organised armies of Poles and Czechoslovaks were aligned with the allied troops. At a meeting of the Supreme War Council in Versailles in June, the Brit., Fr., and It. premiers adopted resolutions to the effect that a united and independent Polish state was a *sine qua non* of peace. The complete independence of Czechoslovakia was also formally recognised by the prin. allies and by the U.S.A. in the early autumn.

Karl's officials, however, still endeavoured to maintain a semblance of order in their crumbling dominions. Martial law was proclaimed in Bohemia and Croatia, and a large army was located on the It. front, though with no hope of launching an offensive; while a few units

were dispatched to the W. front in the vain belief that Germany might win the war after all. The last hope of saving the hapless empire disappeared, however, when Gen. Diaz, in the last week of Oct., suddenly delivered a general attack on the whole front from the Piave to the Alps. Within a fortnight, the Austrians were completely overwhelmed; Trent and Trieste were captured, 300,000 Austro-Hungarian prisoners and 5000 guns, together with nearly all their stores, were taken. An Austrian mission then came to the headquarters of Gen. Diaz and offered unconditional surrender, and an armistice was signed on Nov. 3, without awaiting the outcome of the Ger. negotiations. This reverberating disaster to the Austro-Hungarian armies quickly led to the final disruption of the dual monarchy, and on Oct. 18 Czechoslovakia's independence was declared in Paris, and very soon a constitution was drafted for the new republic, with Prof. Masaryk (q.v.) as president, and the first National Assembly was convened in Prague to ratify the new regime. On Oct. 29, the Croats also formally declared the deposition of Karl, and the separation of their new kingdom of Croats, Serbs, and Slovenes, with King Peter of Serbia as king of Yugoslavia. The other nationalities, Transylvania and Bukovina, then in their turn seceded from A. and Hungary respectively, and negotiated for union with Rumania. It was now the turn of Hungary herself to repudiate any continuance of union with the Teutons, and at the end of Oct. a revolution in Budapest resulted in Count Karoly's announcing that the Magyars were freed from further allegiance to Emperor Karl, and would be constituted an independent republic. The dual monarchy was thus, at long last, at an end. The culminating blow to the 'ramshackle empire' was delivered in Vienna, when a mass demonstration of students and artisans called for a democratic administration. Karl relinquished his crown with dignity and bowed to the inevitable; and on Nov. 13 the National Assembly in Vienna formally declared Ger. A. a republic. *Consult* von Glaise-Horstenau, *The Collapse of the Austro-Hungarian Empire*, trans. by Ian F. D. Morrow (1930); Karl Mowak, *The Collapse of Europe* (1924).

*See also* HUNGARY; and HUNGARIAN REVOLUTION. For the military operations on the It. front *see* ITALIAN FRONT, FIRST WORLD WAR CAMPAIGN ON.

*Hist. of A. from 1918.*—The Republic of A. was declared on Nov. 12, 1918, and the gov. assumed by a National Assembly which appointed a provisional Cabinet. Early in 1919, the National Constitutional Assembly, consisting of a single chamber, was elected on the basis of universal and proportional suffrage. Under the Constitution which came into operation in 1920, a president was chosen for 4 years by both Houses. The Legislature comprised an Assembly, the Nationalrat, and a First Chamber, the Bundesrat, the one elected by popular

vote, the other chosen by the provincial diets. The powers of the Bundesrat were advisory.

The political hist. of A. from 1923 was characterised by a bitter struggle between the Socialists and the bourgeoisie. Socialism, as was to be expected, dominated the National Assembly after the overthrow of the dual monarchy and the setting up of a republic. The first chancellor of the republic was the Socialist leader, Dr. Renner, whose domestic policy it was to establish a working agreement between the Social Democrats and the Christian Socialists. In the National Assembly of 1919 the Social Democrats numbered 70, the Christian Socialists 64 members, and the Ger. Nationalists, the Peasants' party, and others less than 30 between them. A working agreement between the 2 leading parties of necessity meant the virtual extinction of the middle classes, and it became an accomplished fact in the ensuing election; for the bourgeois parties obtained only 28 seats shared among 10 political sections, as against 80 Social Democrats and 61 Christian Socialists. Dr. Renner thereupon formed a coalition Gov., and this coalition was preserved when the Gov., which had resigned as a protest against the terms of the peace treaty presented by the Allies, was re-formed under the same chancellor. While the coalition lasted, with the Socialists as the dominant factor in the State, the aspirations of the middle classes, notably towards a *rapprochement* with Germany, were thwarted. In the next ensuing few years, the chief issues were the Tyrol question and the Anschluss, or union with Germany, the two being, in a manner, allied, as both had relation to pro-Ger. sympathies. The Tyrol question concerned the protection of the Ger. minorities in Tyrol—which old Austrian Crown land, after the First World War, was divided between A. and Italy, the N. going to A. and the S. to Italy—and was of considerable importance even outside the 2 countries immediately affected, because upon its solution depended the further question whether A. could retain even so much of the Crown land as was left to her by the peace treaty. The urgency of the other question, together with the growing influence of the bourgeoisie, destroyed the coalition and ranged the Clericals, who, for all practical purposes, might be regarded as representative of the middle classes, against the Socialists, whose powers now gradually declined. In July 1927 serious rioting occurred between the Socialists and the bourgeoisie. In the early part of the year following, the Tyrol question again became acute; but though the palpable intention of Mussolini, the It. dictator, to omit no step that might Italianise the whole Crown land, gave rise to strong and extensive comment in the press of both countries, no constructive measures were adopted to relieve the tension, despite the bitter complaints of the Tyrolese themselves. Towards this infiltration

policy of the Ita., the Clericals, under Chancellor Seipel (Christian Socialist), could, in the nature of things, adopt only an attitude of passive resistance. Seipel argued that while sympathetic towards his fellow countrymen in their oppression by Mussolini, he had no wish to interfere in the internal problems of a neighbouring state. Mussolini denied the charges of oppression, described the benefits conferred by Fascism upon the Tyrolese, and expressed contempt for



E.N.A.

A PEASANT WOMAN OF SOUTHERN  
TYROL IN NATIONAL DRESS

the suggestion that the matter should be referred to the League of Nations. The crucial point with Mussolini was the safeguarding of the Brenner Pass, which, he said, he would defend at all costs. Dr. Seipel, in view of the disparity between the armed forces of the 2 nations, was helpless, but he was nevertheless bitterly assailed, both in Tyrol and in A. generally, for his surrender to Mussolini's threats.

The bloody conflicts in A. in the summer of 1927 were an expression of revolt against the Seipel Gov., and from that point the power of the Socialists generally began to wane; and in the years following there was a further diminution of their strength. A significant outcome of the riots of July 1927 was the formation of the *Heimwehr*, or bourgeois private army, which was designed as a challenge to the activities of the Socialists' armed forces,

which, in times of stress, patrolled Vienna in the hope of overawing the middle classes. Far from achieving that result, a repetition of the July riots was only narrowly averted in the following Oct., when the Socialists and the *Heimwehr* came into collision at Wiener Neustadt, the recognised headquarters of the former force. The Socialists, as might be expected, accused the bourgeoisie of using the *Heimwehr* as a means of coercing them to the will of the middle classes, and more might have come of this feeling but for the fact that in 1928 all shades of political opinion in A. were united or not unfavourable towards the policy of Anschluss or the movement for a union between A. and Germany. Dr. Seipel, with true statesmanship, opposed such a union in his public utterances; but from the fact that he abstained from entering into any economic agreement with any of the succession states which did not include Germany, afforded evidence of his real sympathies. Towards the end of 1931 the Austrian Gov., which had been in financial straits, tried to form a *zollverein* with Germany, but the hostility of the Fr. Gov. frustrated the attempt. In fact the attempt had been made mainly at the instigation of Nazi politicians, both in Germany and in A., but when Dr. Dollfuss became chancellor of A. he strongly defended Austrian integrity and independence against the pretensions of the Nazis. He went to Rome, concluded a concordat with the pope, and seems to have found some support from Mussolini. But in A. his opposition to the Social Democratic party identified him in the eyes of his opponents with Fascism, so that he was isolated both from the Austrian Nazis as not being extreme enough, and from the whole of the Socialist elements as being a man of dictatorial aspirations, though he might well have won the full support of the Socialists had he given reasonable guarantees of constitutionalism. In Feb. 1934 the Socialists rose in revolt against the *Heimwehr* Fascists under Prince Stahrenberg, and for several days there was civil war in Vienna and in some of the larger provincial towns. The rising was crushed with heavy loss of life to the Socialists, and their leaders were executed; but Dollfuss, who had suppressed the rising, now forfeited much of the support he had previously gained in foreign countries for his resistance to the Ger. Nazis, besides driving the Socialists into a conspiracy with the Austrian Nazis to overthrow his gov. Stringent laws against political violence were now introduced, and some of the Nazi conspirators were imprisoned, with the result that, in July, there was a sudden Nazi revolt, and Dollfuss was assassinated, and succeeded in office by Kurt Schuschnigg. After 1934 Austrian independence was virtually surrendered, inasmuch as Austrian policy was perforce assimilated to that of Germany under an agreement with the Nazi Gov. of that country. Finally, in 1938, the president was forced to resign, the chancellor,

Schuschnigg, was put into prison; the army was incorporated with that of Germany; diplomatic representation abroad was taken over by Germany; the Austrian Diet was dissolved; the Ger. mark substituted for the Austrian schilling; and the country subordinated to the Reich and Hitler's dictatorship. Thus was A. annexed by Germany without resistance and the Anschluss had become an accomplished fact.

There was probably no determined or well-organised opposition to the Ger. occupation among the Austrians, though it was evident that by 1943 the attitude of the people generally was anti-Ger. Sabotage in agriculture was a prominent manifestation of that attitude. Then came opposition by industrial workers, who suffered heavy losses at the hands of S.S. execution squads. At St. Pölten strikes were followed by such serious riots that Himmler himself was compelled to intervene. But A. was useful to Germany as an air-raid shelter, and well-to-do Gers. evacuated their families to A. even before the mass evacuation to the Alpine dists. Hence A. suffered from a shortage of houses and food, and in 1943 the pop. was 10,000,000 compared with 7,000,000 before the war. At the Moscow Conference (Oct. 1943) Great Britain, America, and Russia pledged themselves to restore the independence of A. The armed forces of A. were enrolled with those of Germany, and used throughout the campaign against Russia; but in 1943 the Russian armies invaded A. and captured Vienna (Apr. 13) (for the campaign in Austria see EASTERN FRONT or RUSSO-GERMAN CAMPAIGNS IN SECOND WORLD WAR). On Apr. 29, 1945, a provisional gov. was set up in Vienna by the Russian authorities with the object of restoring an independent Austrian republic. After the cessation of hostilities various zones of A. were occupied by allied forces and administrations: the N.E. or Russian zone included Lower A. (excluding Vienna), that part of Upper A. lying on the l. b. of the Danube, and Burgenland; the N.W. (Amer.) zone, included Salzburg prov. and the rest of Upper A.; the W. (Fr.) zone, included Tyrol and Vorarlberg; and the S. (Brit.) zone included Carinthia (including Ost-Tirol) and Styria (excluding Burgenland). Vienna, within the 1937 boundaries of the city, was jointly occupied by armed forces of the 4 allied powers and its administration directed by an inter-allied governing authority of commandants appointed by the respective commanders-in-chief. At a meeting in Sept. 1945 the allied council of foreign ministers decided that the frontier of A. would not be changed save for minor rectifications, and this decision therefore barred the restoration to A. of the S. Tyrol, of which she was deprived in 1919, unjustly in the opinion of some, unavoidably in the view of most. Thrice in 1947 the major allies failed to agree about a peace treaty and A. remained (1948) divided into 4 zones of occupation. The chief obstacle to a treaty is a dispute over



the interpretation of the phrase 'Ger. assets' to which Russia is entitled under the Potsdam Agreement (q.v.); while Yugoslavia, through Marshal Tito, adhered to a claim for a large part of Carinthia.

**Religion.** Religious liberty is a fundamental law of the republic, and the principle is embodied in the treaty of St. Germain, 1919. There are approximately 6,000,000 Catholics, 200,000 Protestants, and nearly 200,000 Jews. The Catholic Church has 2 archbishops and 4 bishoprics.

**Bibliography.**—Count Julius Andrassy, *Ungarns Ausgleich mit Österreich von Jahre 1867, 1897*; J. Baker, *Austria: her People and their Homeland*, 1912; H. Kelson, *Die Verfassungsgesetze der Republik Österreich*, 1920; M. Dimon, *Österreich*, 1922; A. Feiler, *Das neue Österreich*, 1924; C. A. McCartney, *The Social Revolution in Austria*, 1927; Cicely Hamilton, *Modern Austria*, 1935; E. Lennhoff, *The Last Five Hours of Austria*, 1938; A. W. A. Leeper, *A History of Medieval Austria*, 1941; Kurt von Schuschnigg, *Austria Requiem*, 1947; J. Braunthal, *The Tragedy of Austria*, 1948.

**Austria, Don Juan d',** see JOHN OF AUSTRIA.

**Austria, Lower,** a prov. of A., which, before the First World War, was a Crown land, forming the E. half of the archduchy of A. Area 7452 sq. m. From 1938 to 1945 it was part of Germany. Pop. 1,521,000. It is traversed by the Danube, to the N. of which lies a tableland, while to the S. of the riv. is a mountainous region occupied by offshoots of the E. Alps. A good deal of the land is under forest, but prior to 1939 agriculture, vine-growing, and cattle-rearing were extensively carried on, and there were large manufs. of tobacco, glass, cottons, haberdashery, wine, chemicals, sugar, leather, etc. Sawmilling and weaving too are important industries. Largest tn., Wiener Neustadt. The old cap., Vienna, is now a separate prov.

**Austria, Upper,** a prov. of A., which, before the First World War was a Crown land of A., forming the W. half of the archduchy of A. It, too, became a part of the Ger. Itch. Area 4631 sq. m. Pop. 920,000. It is traversed from N.W. to S.E. by the Danube, to the N. of which lie the tablelands of the Böhmerwald, while to the S. is a mountainous region of the N. Alps. There is a large proportion of forest land. The chief industry is agriculture, all the cereals except maize, hay, fruit, etc., being largely produced. The climate is too cold to be altogether favourable for vine-growing. The mineral wealth includes salt, lignite, gypsum, whetstones, and granite. Cattle are reared in large quantities. The chief manufs. are steelware, textiles, rubber, leather, paper, and glass; and brewing and distilling form important industries. Cap., Linz; other tns., Steyr, Wels, and Gmunden.

**Autarky** (Gk. *αὐταρκεία*, economic self-sufficiency). The idea that a country should produce everything it required and

cut down foreign imported goods gained considerable impetus after the First World War. Eire and Italy are 2 outstanding instances, but in neither case was the experiment a success. Hitler's 'new order' (1941) stultified the efforts of other European countries in this direction. The movement for A. in Nazi Germany itself, however, provided the best instance, being based primarily on military considerations in the hope of making the country immune from the rigours of blockade. Autarchy (Gk. *αὐταρχία*) means the gov. of a single person, or absolutism.

**Auteuil**, dist. of Paris, on the r. b. of the Seine, close to the Bois de Boulogne. It was formerly a vil. in the dept. of Seine. Molière lived here, and the place has numerous literary associations.

**Autoun, or Autun, Jehan d'** (1466–1527), Fr. poet and historian, was a native of Beaurepaire, and a Benedictine monk. He was historiographer to Louis XII., the subject of his chief work, *Chronique du roi Louis XII.* Amongst his poetical works is a translation of Ovid's *Metamorphoses*.

**Authorised Version (of the Bible)**, the version of the Bible into Eng., made at the suggestion of James I. by 47 learned divines. It took 3 years—viz. from 1607 to 1610—to execute, and was first pub. in 1611. It is the only one 'appointed to be read in churches,' and until fairly recently its title-page contained the words 'printed by authority.' It has held its place so long more by its own merits than by the artificial support of law, and while there are numerous minor defects, which have been corrected in the R.V. of the N.T., it remains, in all essential respects, the same Bible which for nearly 3 centuries has been the most potent factor in the spiritual education of the Eng.-speaking race. See also BIBLE, THE.

**Authors, Playwrights, and Composers, The Incorporated Society of**, was founded by Sir Walter Besant and other literary men in 1883 for the protection of writers in the fields of general literature, drama, and music. It advises members with regard to the publication of their works, and in the interests of its subscribers keeps a vigilant outlook on publishers in regard to matters affecting payment, the drawing up of agreements, etc. In recent years the inventions of the gramophone, the cinema, and broadcasting have enormously extended the work of the society. There is an agreement between the society and the B.B.C. as to the fees payable for broadcasting its members' work. The society has now about 4000 members, and it publishes a quarterly jour. called *The Author*. The address of the secretary is 84 Drayton Gardens, London, S.W.10. In the U.S.A. the Authors' League of America, Incorporated, founded in 1912, renders its members similar services.

**Authors' League of America**, founded in 1912, opens its membership to authors, artists, playwrights, and writers of scenarios for the films, provided that they make a regular profession of their

work and are not merely unpaid amateurs. The league gives helpful advice to its members on the placing of their works, advises them as to the proper rates of remuneration, and assists them in legal difficulties.

**Auto**, the name of various types of religious and morality plays popular in Spain and Portugal from the twelfth century onwards, and still performed in the latter country. They reached their highest perfection in the *As. sacramentales* of Lope de Vega (1562-1835) and Calderón (1600-81). The former was the author of 400 *As*. These plays were generally represented on days of religious festivals, the feast of Corpus Christi being especially chosen for such performances. They were mostly of an allegorical nature, the leading characters being personifications of vices, virtues, etc. They were frequently produced with great elaboration.

**Autobiography**, see **BIOGRAPHY**.

**Autocars**, see **MOTOR CARS AND MOTOR CYCLES**.

**Autochthones**, the Gk. equivalent of the Lat. term *aborigines*, was applied to the first inhab. of a dist. as distinct from later comers. In the Gk. mythology various dists. had their own *As*., or first parents, who were supposed to have sprung from the rocks and trees.

**Autoclave**, an air-tight heating vessel, on the principle of Papin's digester, made of iron or steel, usually supplied with a safety-valve, in which substances can be heated above their boiling-points under pressure. Various types of *A.* are used respectively for sterilisation and chemical and cooking purposes. In chem. *As.* are used to produce reactions under great pressure.

**Autocracy**, see **GOVERNMENT**.

**Auto-da-fé** (act of faith), the ceremony of the Inquisition in Spain and Portugal at which heretics were burnt after a public procession and service in the church. All Saints' Day was a favourite day for the *auto-da-fé*. An *auto-da-fé* was celebrated in Mexico as late as 1815.

**Autogiro**, a heavier-than-air craft with freely rotating wings. Although resembling a helicopter (*q.v.*) in its general appearance the *A.*, invented by Don Juan de la Cierva, is an entirely original conception, and was the first practical rotary-winged aircraft. The aircraft consists of a fuselage, engine, and tail unit similar to that of a conventional aeroplane with rotor blades hinged to a pylon above the fuselage. These rotor blades are narrow-chord wings which obtain their lift (see **AEROPLANE**) by the air speed of their rotation. The blades are hinged, so that they can rise and fall considerably, and have a restricted lateral movement so that they are free to take up different positions to suit their relative air speeds and the forces acting on them. The essential feature of the *A.* is that, once it has been started and the machine is airborne, the rotor is not engine-driven, but is kept rotating by the air forces on the blades like the sails of a windmill.

The earliest *As.* (c. 1924) had cable-braced rotors which were started by a

rope wound round the hub and pulled by sev. men, the aircraft thereafter being taxied round until the rotor speed was sufficient for take-off. Later, with the development of aircraft brakes, the rotor was started by deflecting the air from the airscrew of the engine up into it by tilting the tail plane while running up. Then the engine was geared to the rotor for



FIG. 1. THE ORIGINAL CIERVA 'DYNAMIC-START' AUTOGIRO

It ascends vertically through the energy stored in the rotor.

starting purposes only. In 1934 Cierva invented a system whereby the rotor is held at a low incidence (i.e. negative lift) and turned by the engine at a higher speed than that necessary for take-off, then a control disconnects the engine from the rotor, and its incidence is increased so that the energy in the rotor is converted into lift, making the machine jump off the ground.



FIG. 2. A FRENCH CABIN AUTOGIRO

In this aircraft the air-cooled engine is behind the cabin, and drives the airscrew by a shaft. Weight distribution is improved by this system.

Although the *A.* was the invention of Cierva, and he did all the pioneer work on it, the principles were developed in America (where sev. successful types have been flown), in Britain by other designers, and also on the Continent. Prior to the 1939-45 war the *A.* had become a practical proposition, and the experience gained in actual flight with these autogiro machines laid the foundation for the practical development of the helicopter. The *A.* still has a place in aviation, since it is easier to fly than the helicopter, and its maintenance is much simpler.

**Autograph**, something written in a person's own hand. The term is applied both to mere signatures and to documents of any description. *A.* hunters have become one of the accepted nuisances of modern civilisation, but they may claim to be carrying on a custom which seems

to have its origin as early as the fourteenth century, in the *Liber Amicorum*, a kind of visitors' book. In the sixteenth century were formed such famous collections of As. as those of Loménie de Brienne and Lacroix du Maine. Evidence of a craze for the signatures of celebrities is afforded by a number of albums of the time of Elizabeth and James I. now in the Brit. Museum. Amongst high prices which have been paid for As. of famous people are the 300 guineas paid by the Brit. Museum in 1858 for a Shakespeare signature, and the £85 for a letter of Defoe, 1887. Many collections of A. reproductions have been pub., notably Nichols's *Autographs of Royal, Noble, Learned, and Remarkable Personages*, 1829; Delpech's *French Autographs*, 1832; *Isographie des hommes célèbres*, Paris, 1843; and *Facsimiles of Royal, Historical, Literary, and other Autographs in the British Museum*, 1896-1900. See also Günther and Schulz's *Handbuch für Autographensammler*, 1856; Scott and Davey's *Guide to the Collector of Historical Documents*, etc., 1891; and Broadley's *Autographs*, 1910. The relation between As. and character has been ingeniously treated in Poe's *Chapter on Autography*.

**Auto-intoxication**, the condition subsequent upon the production within the body of poisons due to perverted functions of organs or tissues. As all the tissues of the body are mutually interdependent, defect in 1 part is followed by widespread effects, and the symptoms of A.-I. are accordingly very varied. Among the most common types are uræmia, or the headache and drowsiness consequent upon excess of urea in the blood; Graves's disease, said to be due to excess of thyroid secretion; the delirium and coma of diabetes, caused by the saturation of the sodium salts of the blood by acetoacetic and oxybutyric acids, the products of imperfect proteid metabolism; the degenerative changes in the spinal cord in pernicious anemia, due to absorption of poisons from the alimentary canal; some forms of acute insanity, caused by defective metabolism or physiological instability, or both; and general symptoms produced by the products of fatigue or indigestion.

**Autolyus**: 1. The son of Hermes, and grandfather of Ulysses, was notorious for the cunning with which he stole his neighbours' flocks. He was at last detected by Sisyphus, who marked his sheep under the feet. Shakespeare's A. in the *Winter's Tale*, possesses similar characteristics. 2. A. of Pitane, an early Gk. writer on mathematics and astronomy (fl. fourth century B.C.), who is reputed to have taught Arcesilaus. He wrote 2 treatises of little value on the motion of the sphere and on the rising and setting of the fixed stars.

**Automatic Action**, a physiological and psychological term used to denote all non-reflex actions which are not the result of conscious endeavour. Actions may be purely A. when they are performed while the attention is fixed altogether upon

another object, or relative, when the details of an action are performed unconsciously while the attention is fixed upon the end or some other part of that action. Sleep-walking is one of the most common forms of A. A., and many of the phenomena of divination, spiritualism, etc., may be explained on this basis. A. As. are distinguished from reflex actions by being produced by an internal instead of an external impulse, but in practice the two are frequently indistinguishable.

**Automatic Machines**, a term generally applied to machines which, when once set in action and provided with necessary motive power, continue to work without further human intervention. Many types of wood-working and metal-shaping machines, conveyors, weighing appliances, etc., are constructed on this principle: A. voting machines, A. change machines, etc., carry out the same idea on a smaller scale.

**Automatism**, the power of self-movement without external stimulus as exhibited in life of the cell or organism, and in the will of man. The term is also applied to the philosophical doctrine that all the actions of living beings, including man, are physiological in their origin, and are not the effect of volition, which is merely an accompaniment of the action.

**Automaton**, a machine that imitates the actions of men and animals. The term is derived from the Gk., and signifies something which moves of its own accord. The first recorded A. seems to have been the wooden pigeon made by Archytas of Tarentum, 400 B.C. It is probable that many of the apparent miracles which from the earliest times have imposed upon the credulous are to be attributed to this agency. Among the reputed automata of the Middle Ages mention must be made of the fly made by Regiomontanus, which came back to his hand after a flight round the room, and his eagle, which flew round the Emperor Maximilian during his entry into Nuremberg; also the speaking brass head of Roger Bacon and the figure which acted as doorkeeper to Albertus Magnus. In the first half of the eighteenth century 3 remarkably ingenious automata were constructed by the Fr. mechanician Vaucanson. His flute-player, exhibited in Paris in 1738, was a remarkable imitation, the player placing his lips to the instrument and its fingers on the stops. The second was a tambourine player, and the third a duck that digested its food, in addition to eating, swimming, and drinking. Later came the writing A. of Knauss, exhibited at Vienna, and the trumpeters of Kaufmann and Maelzel. In 1851 a piping bullfinch attracted considerable attention at the London Exhibition. Amongst modern contrivances the place of honour must be given to Maskebyne's 2 figures, 'Psycho' and 'Zoe'. The former, first exhibited in 1875, played whist and worked out arithmetical problems, while 'Zoe' would draw the portrait of any one selected from a list of

200 persons of note. Kempelen's chess-player, introduced to London in 1783 as an A., was in reality worked by a human being skillfully concealed inside.

**Automobile**, see MOTOR CARS AND MOTOR CYCLES.

**Autonomy**, in its political sense denotes the polity of self-gov. or a self-governing community. Varying degrees of A. are exhibited by the Brit. colonies and dependencies, while a more perfect instance, perhaps, is afforded by the powers of independent action possessed by the anct. Gk. city communities. In Kant's philosophical use of the term it expresses the principle that no law without a moral foundation can be held as binding on the conscience.

**Autoplasty** (Gk. αὐτός, self, πλαστός, formed) is the repair of wounds or diseased parts of the flesh by means of tissues taken from other parts of the same body.

**Autopsy**, see POST-MORTEM EXAMINATION.

**Autotype**, see under PHOTOGRAPHY.

**Autran, Joseph** (1813-77), Fr. poet and dramatist, gained the Montyon prize of the Fr. Academy with his tragedy *La Pille d'Eschyle*, and was elected to the Academy in 1868. Amongst his vols. of verse are *La Mer*, 1835; *Miliana*, 1842; *Épîtres rustiques*, 1862; and *Sonnets capricieux*, 1873, all of which are distinguished by purity of form and beauty of rhythm.

**Autrefois Acquit and Autrefois Convict**, pleas by an accused person that he had been previously acquitted or convicted of the same crime of which he is now accused. The plea only holds good in cases of acquittal or conviction by a court of competent jurisdiction.

**Autumn**, in a popular sense, comprises the months of Sept., Oct., and Nov. In the N. hemisphere A. is astronomically the period between the autumnal equinox, when the sun enters the zodiacal sign of Libra (Sept. 22), and the winter solstice (Dec. 21). It corresponds to the springtime of the S. hemisphere.

**Autun**, a tn. and episcopal see in dist. of same name, dept. of Saône-et-Loire, France, on the Arroux, 31 m. N.W. of Chalon by rail and 55 m. N.N.W. of Mâcon. It has important paper-making, textile, and tanning industries. A. has been thought by some to occupy the site of Bibracte, at the time of Caesar's invasion of Gaul the most important city of the Ædul. Under the Romans the name was changed to Augustodunum, and the city became famous for its school of rhetoric. After being destroyed in A.D. 270 by Tetricus and rebuilt by Constantine the Great, it became a flourishing city, only to be sacked and burned in turn by the Vandals (406), the Burgundians (414), the Huns (451), and the Franks (534). It suffered a similar fate from the Arabs in 739, and from the Normans in 1895. It was burned by the Eng. in 1379. A. possesses many Rom. remains, including a theatre and a pyramid. The cathedral, dating from the eleventh and twelfth centuries, has a fine fifteenth-century spire. Pop. 13,856.

**Autun, Jehan d'**, see AUTHON.

**Auvergne**, a dist. of Central France, formerly a separate prov., now forms the depts. of Cantal and Puy-de-Dôme, with the N.W. portion of Haute-Loire. Upper A. is rugged and mountainous, with a climate subject to great extremes, while Lower A. is more level and contains some remarkably fertile dists. There are rich mineral deposits in the mountainous region, which also contains many mineral springs. The prov. was united to France in 1531, after passing through the hands of many families. The name is derived from the early inhab., the Arverni, who offered stern opposition to Caesar.

**Auvigny, Jean du Castro d'** (1712-43), Fr. writer and soldier, killed at the battle of Dettingen. He was the author of *Mémoires de Madame de Barnevelt* (in collaboration), 1732; *Histoire de la Ville de Paris*, 1735; and the first 8 vols. of *Les des hommes illustres de la France*, 1839-57.

**Aux Cayes**, see CAYES, LES.

**Auxerre**, cap. tn. of dept. of Yonne, France, 110 m. S.E. of Paris, on the R. Yonne. It has manufs. of cloth and chemicals, and produces wine. The fine Gothic cathedral dates partly from the thirteenth century. Other notable buildings are the prefecture, formerly the bishop's palace, and the abbey of St. Germain, now used as a school. Pop. 24,300.

**Auxiliary Territorial Service**, the Brit. women's army corps formed during the Second World War, but planned as early as 1938. By Feb. 1941 some 40,000 women had been enlisted; by Jan. 1942 there were nearly 100,000; and by 1944 some 212,000. Of the women's armies in this war they were the most numerous body. The chief controller had the equivalent army rank of a major-general; the other ranks, with their equivalent army ranks, were: senior controller (brigadier), controller (colonel), chief commandant (lieut.-col.), senior commandant (major), company commander (capt.), junior commander (lieut.), company assistant (second lieut.), senior leader (warrant officer class II.), section leader (sergt.), sub-leader (corp.), chief volunteer (lance-corp.), volunteer (private). The women were not directly conscripted, but enlisted through the directive machinery of the Ministry of Labour and National Service. The A.T.S. served in France, Canada, Germany, the W. Indies, Palestine, Egypt, N. Africa, E. Africa, Italy, and Washington. Some 3000 women qualified for the Africa Star. Twenty thousand worked in cookhouses; 30,000 were office, mess, and telephone orderlies; 14,000 were drivers; 10,000, postal workers; 9000, storowomen. Others served as butchers and bakers, ammunition examiners, hairdressers, welders, cine projectionists, camouflage modellers, chiropodists, and military policewomen. Others, specially trained, were on operational work as plotters, spotters, predictionists, and in other work as members of gun crews.

The girls of the A.T.S. endured many of the perils of war side by side with the soldier. They were subject to some at least of the military laws, in a way that the W.R.N.S., for instance, in relation to the Navy, were not subject. The name of the corps was changed in 1948 to the Women's Royal Army Corps.

**Auxiliary Verbs** are verbs which are used with other verbs to help to form the voices, moods, or tenses of the latter. When so used they lose practically all their original signification. Such verbs are 'have,' 'may,' 'must,' etc., in Eng.; 'haben,' 'werden,' in Ger.; and 'être,' 'avoir,' in French.

**Auximum**, see OSIMO.

**Auxonne**, fort. tn., dept. of Côte-d'Or, France, on the Saône, 20 m. S.E. of Dijon. Has cloth and other manufs. Noteworthy buildings are the Renaissance château and the church of Notre-Dame (fourteenth century). Pop. 5000.

**Auzout**, Adrien (1630-91), Fr. astronomer, and inventor of the micrometer for measuring the apparent diameters of the heavenly bodies. He was the author of *Traité du micromètre*, 1667; *Lettres sur les grandes lunettes*, and various scientific memoirs.

**Ava**, a ruined city, Burma, on the l. b. of the Irawadi, 6 m. S.W. of Amarapura. From 1364 to 1740 it was the cap. of Burma, and again from 1822 to 1838. It was destroyed by an earthquake in 1839.

**Ava**, see DUFFERIN and AVA.

**Avadavat**, see AMADAVAT.

**Avalanche** (Fr. *avalée*, to descend), a mass of ice or snow, mixed sometimes with earth, which becomes loosened from a mountain slope and dashes into the valleys, sometimes causing great destruction. There are various kinds—drift or powder As., composed of dry powdering snow, and blown into the valley like a cloud; As. caused by the melting of the snow in spring, in which case the ground itself becomes loose, and is swept down with trees and rocks; and ice As., consisting of frozen snow and ice, sweeping down from the glaciers, most frequently during the summer months. In 1827 no fewer than 88 people perished in an A. which swept away half the Alpine vil. of Bliel.

**Avalite**, a silicate found in green scales at the Mt. Avala mines in Belgrade, where mercury is found.

**Avallon** (auct. Aballo), tn., dept. of Yonne, France, 30 m. S.E. of Auxerre, on the R. Cousin. The tn. has a church dating from the twelfth century. Pop. 6000.

**Avalon** (Apple-green Island), the paradise of Celtic mythology. Tennyson's 'island-valley of Avilion. Some have thought to identify the A. of Arthurian legend with Glastonbury. A. contained a mystic fountain and the magic apples, and was the Valhalla of the Celtic heroes.

**Avalon**, peninsula, Newfoundland, forming S.E. portion of the is. In it stands the cap., St. John's.

**Avalos**, Fernando Francesco de, Marquis of Pescara, see PESCARA.

**Avanturine**, or **Aventurine**, a glass-like

variety of quartz, containing numerous spangles of brown mica. It is most common in the Ural Mts., but is also found in France, Spain, Austria, and India. There is also artificial A., consisting of glass into which red spangles of copper are introduced. A. is much used for the handles of umbrellas, brooches, etc.

**Avanzi**, Jacopo di Paolo d', It. painter of the fourteenth century. He is supposed to have been a pupil of both Franco Bolognese and Vitale delle Madonne. Only a few of his works remain. He painted the frescoes of the chapel of San Felice, in the church of Sant' Antonio at Padua, 1376; frescoes in the old church of the Madonna di Mezzarata, with Simone da Bologna; 2 Triumphs in a public hall in Verona; and some work in the chapel of San Giorgio in the church of Sant' Antonio at Padua, with Aldighieri da Zevio. Two pictures in the gallery of Bologna are also attributed to him.

**Avaris**, a city of anct. Egypt, on the isthmus of Suez, for long the centre of operations of the shepherd-kings. It has been identified with the Heropolis of the Gks.

**Avars**, a warlike people of Tatar origin who settled on the steppes of the Don and in the neighbourhood of the Caucasus. They penetrated as far as Dacia and served in the army of the Emperor Justinian, A.D. 558. Later they took possession of Panonnia, and in 566 joined the Longobards against the Goths. From this time until the close of the first half of the seventh century they greatly extended their dominion over the Bulgarians and the Slav peoples of the Danube, until, in A.D. 640, they were driven out of Dalmatia. Their power was finally destroyed by Charlemagne in 796, and as a separate race they seem to have disappeared shortly afterwards.

**Avasaksa**, a mt. of Finland, near Tornea, forming an excellent vantage ground for witnessing the phenomenon of the midnight sun.

**Avatar** (Sanskrit *avatāra*, descent) signifies in Hindu mythology the descent of a deity to earth in a visible form. The 10 incarnations of Vishnu are notable As.

**Avatcha Bay**, a large basin or the E. coast of Kamchatka, between Cape Gavaria and Areposki, the best harbour of the whole peninsula. The entrance, which varies in width from 4 m. to 1½ m., and is surrounded by high land, leads into a larger basin with a circumference of 30 m., in which are the 3 harbours of Radkoveena, Petropavlovsk, and Tarelski. The bottom of the bay is formed of a soft mud, and is level, whilst the depth varies from 12 to 14 fathoms. Fish are abundant, and the surrounding land is well wooded; the bay is generally frozen over in the winter. The R. A., at the head of the bay, is very rapid, and though a quarter of a m. broad at the entrance, it soon becomes narrow, and is navigable only by canoes. The light-house at the N.E. end of the entrance is situate in 52° 52' N. lat. and 158° 47' E. long.

**Avaugour, Pierre Dubois, Baron d'** (d. 1864). A governor-general of Canada, 1661-63. Was previously Fr. ambassador in Sweden. He quarrelled with Bishop Laval over the question of the sale of brandy to the Indians, A. regarding the traffic as commercially beneficial to Canada, and especially to the fur traders; but Laval succeeded in getting him recalled. It was during A.'s tenure that Groselliers and Radisson, Fr. fur traders, explored the country N. of Lake Superior, and in this matter, too, A. quarrelled, demanding part of the profits of the expedition. His report on Quebec shows that he was the first to point out the advisability of the Fr. seizing Lake Champlain and the Hudson R. as far down as Manhattan, so as to possess an open-water harbour in the S. In his time, too, the Iroquois were subdued (see ARGENSON), the colony making good progress thereafter. A. was killed in Hungary in a campaign against the Turks.

**Avebury, a vil. and par. in Wiltshire**, which is remarkable as the site of what appears to have been one of the largest pre-Celtic or Druidical temples in Europe. About 650 blocks of stone seem to have been placed in circles and rows. These stones, of which few remain, are of various sizes, from 5 to 20 ft. high and 3 to 12 ft. thick. There is a great variance of opinion as to the time when and the purpose for which this singular work was constructed, but it is thought that it was built over 3500 years ago, in the first phase of the Early Bronze Age. With its outer ring of massive stones enclosing over 28 ac., and its bank,  $\frac{1}{2}$  m. in circumference, rising originally 50 ft. above the bottom of the ditch, it is the most impressive of its kind in Europe, and the mightiest effort of prehistoric man. Yet for centuries this heritage was allowed to decay, and the megaliths were treated as quarries for building stone, while in the Middle Ages many were buried. Much is owed to Mr. Alexander Keiller, the owner of the site and director of the Morven Institute of Archaeological Research, for the work of preservation and restoration which was carried out in co-operation with the Ministry of Works. In 1925-26 Mr. Keiller bought Windmill Hill,  $1\frac{1}{2}$  m. N.W. of A., which hill, in his opinion, was of even greater significance than A. itself, and from 1929 he and his staff excavated the site. In 1938 the A. museum was opened in the eighteenth-century stables of the manor house. Previously, in 1935, the Office of Works first envisaged the preservation of A. and its surroundings in a planning scheme; but further anxieties for its preservation were set at rest in 1943, when the National Trust acquired 930 ac. of land at A. for the nation. The purchase from Mr. Keiller included the greater part of the group of prehistoric remains, the neolithic site of Windmill Hill, and the manor farm of 650 ac.

**Avebury, Sir John Lubbock, first Baron** (1834-1913). He was educated at Eton, finishing his education at home. As a politician he represented Maidstone in parliament from 1870 to 1880. The

different presidential chairs held by him at various times embrace those of Entomological, Ethnological, Linnean, Anthropological, Ray, Statistical, African, Antiquaries, Royal Microscopic, Sociological, Prehistoric, Archaeological, International Library, Societies and Institutions. His democratic tendencies were shown by his positions as principal of the London Working Men's College, and president of the London Univ. Extension Society. Among his voluminous works are *Prehistoric Times*, 1865; *On Origin and Metamorphoses of Insects*, 1874; *The Pleasures of Life*, 1887-89; *On the Senses and Instincts of Animals*, 1888; *The Use of Life*, 1894; *The Scenery of Switzerland*, 1896; *Free Trade*, 1902; and *Notes on the Life History of British Flowering Plants*, 1905. Better known, popularly, as the founder of Aug. bank holiday. Life, including bibliography, by H. G. Hutchinson, 1914.

**Aveiro**, chief tn. in the dist. of the same name in Portugal on the banks of the R. Vouga. It has earthenware factories, and salt is obtained from the lagoons about the tn.; besides this a trade in oil, wine, and oranges and a large fishing industry are carried on. It contains a cathedral, and is the see of a bishop. Pop. (dist.) 382,000, (tn.) 31,000.

**Avella**, the Rom. Abella, is an It. tn. in the prov. of Campania, situated 15 m. from Naples; pop. 4000.

**Avellaneda**, a manufacturing tn. on the R. Riachuelo, Argentine, named after Nicholas A. (q.v.). Pop. 234,000.

**Avellaneda, Nicolás** (1830-85), an Argentine statesman, b. at Tucuman. His family were exiled from the country, but after the fall of Rosas in 1852 A. returned. He became a member of Congress in 1860, prof. of political economy in 1861, and was minister of public instruction in 1868. During his tenure of office the country made remarkable progress, and in 1874 he was elected president of the republic. He put down the insurrection of Mibie in 1875, and in the same year sent an expedition against the Indians. He was superseded in power by Gen. Roca on Oct. 12, 1880.

**Avellino**, the cap. of the It. prov. of the same name, 30 m. from Naples. It is built in a valley by the R. Sabato. Three m. to the N. is the sanctuary of Monte Vergine, built in the eleventh century, and once a rich Benedictine abbey. The prov. abounds with nut-trees, whose fruit was much esteemed by the Romans under the name of *nux Avellana*. Pop. 25,694.

**Ave Maria**, the first 2 words of a Lat. prayer to the Virgin Mary used by Rom. Catholics. The first part is the salutation of the angel to Mary on her conception (Luke i. 28). The second part is an entreaty to the Virgin to pray for the salvation of sinners now and after death. The prayer usually follows the *Pater Noster* or Lord's Prayer.

**Avenpace**, or Avenpace, an Arabian philosopher and poet, of whose life we know little save that he was b. at Saragosa. He was some time a physician at Seville; d. in 1138. Among his works are treatises on the soul, on solitary life,

on logic, and on natural science. Many of these are unfinished.

**Avena**, the name of a genus of grasses which has deeply furrowed grains enclosed in glumes adherent to them. The genus contains 50 widely distributed species, of which the most important is the *A. sativa*, or oat.

**Avenches**, a vil. of Switzerland situated in a detached part of the Vaud. Formerly it was on the lake of Morat, but now it is  $1\frac{1}{2}$  m. from the present shore. It was sacked by the Huns in the year 447. Pop. 1600.

**Avens** are plants of the order Rosaceæ, related to the potentilla, strawberry, blackberry, and raspberry. The species *Geum rivale*, water A., and *G. urbanum*, wood A., grow in woods and damp fields of Britain. The mt. A., or *Dryas octopetala*, is an Alpine shrub.

**Aventail**, the flap or movable front of the helmet in old armour.

**Aventine Hill**, one of the 7 hills of Rome, lying to the E. of the Tiber. It was included in the city of Servius Tullius, and a settlement of the plebs was made upon it in 455 B.C. The anct. buildings formerly upon it have completely vanished.

**Aventinus** (1477-1534), a name used by Johann Turmair, the author of the *Annales Boiorum*. He was a native of Abensberg, whose Lat. name he adopted. He has been called the Bavarian Herodotus, and his work, *Annales Boiorum*, is a hist. of Bavaria of much fame. Part of this work was suppressed on account of its reflection upon the Rom. Catholics, but a more complete ed. was produced in 1580.

**Aventurine**, see AVANTURINE.

**Avenzoar**, or **Aven Zohar**, the name of 2 Arabian physicians who lived in Spain in the twelfth century. 1. Abumeron Avenzoar, or, in full, Abu Mervan Mohammed ben Abdal-Malik ben Zohar. According to the Arabian author Ebn Alabari, he was a native of Seville; lived as physician at the court of Ibrahim ben Yussuf ben Tashfin, the Almoravide sovereign of Morocco and Cordova, and d. in 1162. He wrote sev. works on medicine, the most important of which is the *Taisir*, or Introduction. Lat. translations of his other works are *De Cura Calculi* (Venice, 1497), and *De Itegrimine Sanitatis* (Basle, 1618). 2. The younger A., who is also named Rhasis, was his son. He was physician to Mansur, the Almoravide sovereign of Morocco, and d. in Morocco, 1197.

**Average**: 1. In the science of numbers an A. is a sum or quantity intermediate to a number of sums or quantities, which is obtained by adding the sums or quantities together and dividing by the number; thus, if 5 sacks contain 6, 8, 11, 12, and 13 lb. respectively, the A. weight will be  $\frac{6+8+11+12+13}{5} = \frac{50}{5} = 10$  lb. The A.

of such a kind is an arithmetical mean. But in ascertaining As. which are to be of value in statistical or for other scientific purposes, such arithmetical As. are not sufficient, and attention must be paid to

the relative importance to each other of the quantities thus added together, and as it is called by statisticians, the 'weighted' rather than the 'arithmetical' mean should be sought for. A simple example may be given. A offers to sell to B 3 plantations of trees, which he averages before counting the trees in each plantation at 2s. per tree for the first, 1s. 6d. for the second, and 1s. for the third. The arithmetical A. or mean price would be  $4s. 6d. \div 3 = 1s. 6d.$  On felling the trees in each plantation the numbers work out thus: 200 in the first, 100 in the second, 300 in the third; the weighted mean or A. will be then found by multiplying the number of trees in each plantation by the original price, adding the total, and dividing by the total number of trees; the weighted mean is then  $1s. 5d.$  2. A term is used in shipping law in relation to loss of or damage to cargo or ships. It is of 2 kinds: (1) *General A.*, which connotes all loss which arises in consequence of extraordinary sacrifices made, or expenses incurred, for the preservation of the ship and cargo. In this case, if the sacrifice was incurred to avoid a danger common to all the interests, and was both real and voluntary, then the cargo-owner or ship-owner who has sustained such loss or expense is entitled, provided the ship and cargo or some portion have actually been preserved, to be recouped his loss or part of it from the other interests in the adventure. The question of general A., which is entirely in the hands of A. adjusters, is regulated for the most part by the York-Antwerp Rules of 1877 (as revised in 1890), and most Eng. contracts of carriage and marine insurance embody a reference to these rules. (2) *Particular A.* (so called) or 'partial loss.' This arises whenever damage is done to the goods or property of an individual by accident or otherwise, but which damage is not suffered for the general benefit, e.g. damage by water to cargo.

**Averaging**, an operation on the stock exchange, by which a speculator increases his transactions at a higher or a lower figure when the market is going against him, so that the average price of the whole will be higher or lower than his original sale or purchase. Thus a 'bull' would purchase more stock and a 'bear' would sell more, as the price fell away or rose against him. A relatively smaller movement is thus necessary to ensure a profit.

**Averescu**, Marshal Alexander (1858-1938), Rumanian soldier and Prime Minister, b. at Ismail, Bessarabia, war minister, 1907; during the second Balkan War of 1913 he was chief of staff in the Rumanian invasion of Bulgaria. In the First World War he commanded the Rumanian army of the Danube in Transylvania and later held the supreme command in the Dobrudja. He strove to repel the Germano-Austrian advance under Gen. Mackensen, but had to fall back on Bucharest, which fell Dec. 7, 1916. He evacuated the Dobrudja Jan.

1917 and took up a new line on the Sereth in defence of Moldavia, but on the defection of Russia (see BREKST-LITOVSK, TREATY OF) was compelled to surrender unconditionally. After the war he founded the Popular party. He was Prime Minister in 1918, 1920-21, and 1926-27. Formed a political alliance in Rumania to combat any move to bring back Prince Carol.

**Averno**, a lake near Naples, about 2½ m. N.W. of Pozzuoli near the gulf of Baia. Its classical name was Avernus. It is a circular sheet of water, about 1½ m. in circumference and of great depth. It is the crater of an extinct volcano, and its darkness and the noxious vapours, which were supposed at one time to have arisen from it, said to be fatal to birds, caused the anc. poets to refer to it as the entrance to the infernal regions. The lake, which is 213 ft. deep and 3½ ft. above sea-level, figured as the scene of many other legends centuries ago. It was supposed to be connected with the lower world, hence Virgil's 'Facilis descensus Averno.' In 214 B.C. Hannibal made a pilgrimage to it. Remains of baths are on the E. of the lake, including a lofty octagonal hall called the Temple of Apollo.

**Averrhoa**, a kind of sheep-sorrel, or sour-grass, allied to the oxalis, native to India. The leaves are alternate and have no stipulae, while the flowers are arranged in cluster forming a panicle. Sev. varieties, such as the bilimbi tree or carambola, have an acid and refreshing fruit, used in the preparation of lemonades.

**Averroes** (1149-98), an Arabian philosopher and physician, was b. at Cordova, where his father was chief judge and priest. He studied theology and philosophy under Avempace and Tofall, and medicine under Avenzohar. He adopted the creed of the Ashari sect, and succeeded his father as chief judge. He was afterwards appointed chief judge in Mauretania, deposed for his heretical doctrines, but afterwards reinstated. The writings of A. were numerous. An ed. in Lat. was pub. at Venice in 1562. His commentaries on Aristotle and Plato's *Republic* are perhaps the best known. The Lat. eds. of his works include the *Kulliyat* (i.e. Summary), his chief medical work, usually known as *Colliget Aserrois*.

**Avers**, a valley in Grisons canton, Switzerland, adjoining the Hinter-Rhein Valley. The lower portion, known as the Ferrera Glen, lying between Canicul and Cresta, is said to be the highest inhabited place in Europe (6394 ft.).

**Aversa**, a tn. and episcopal see of Campania, Italy. It was the first place in which the Normans settled. In 1027 it was given to them by Duke Sergius of Naples as a reward for help against Pandulf IV. of Capua. It is connected by rail with Naples and Caserta, and it has a large lunatic asylum founded by Joachim Murat in 1813. Pop. 35,000.

**Avesnes**, a tn. in N. France. It forms the cap. of an arron. in the dept. of Nord. Its chief industry is wool spinning.

It possesses a sixteenth-century church famous for its fine peal of bells. Pop. 5400.

**Avesta** is the name under which the Mazdean texts are grouped. These are the sacred books of the anc. Persians, and are attributed to Zoroaster. For the information as to their purport, see ZOROASTRIANISM.

**Aveyron**, a dept. of S. France. Its area is 3336 sq. m. The first inhab. of the region were the Celtic Rutheni. It lies on the S. border of the central plateau of France, and has for its chief rvs. the Lot, A., the and the Tarn. All these are tribs. of the Garonne. The dept. has many interesting tns., the chief being Rodez. The climate is somewhat changeable owing to the varying elevations. In the mountains it is severe, while in the valleys it is mild. The chief crops are wheat, rye, and oats. The inhab. live by rearing live-stock. Roquefort cheeses, Entraygues, St. Georges, Bouillac, and Najac wines have some reputation. The chief tns. are Rodez, Espalion, Millau, St. Affrique, and Villefranche. The Orleans and S. railways cross the dist. Pop. 314,000.

**Avezzano**, a tn. of the Abruzzi, Italy. It is in the prov. of Aquila, on the main line of the railway from Rome to Castellammare Adriatico. The Palazzo Torlonia, which was used in the Second World War by the Gers. as a headquarters, was heavily bombed and damaged. Pop. 17,000.

**Aviano**, tn. of Italy, near Monte Cavallo, 30 m. W. of Udine. Pop. 7000.

**Avianus**, **Flavius**, a Lat. writer of fables. His age is not certainly known, but is probably fourth century A.D. He seems to have lived at Rome. His fables are 42 in number, and resemble those of Babrius. They were dedicated to one Macrobius Theodosius. See the *Prolegomena* to the ed. of R. Ellis (Oxford, 1837).

**Aviary** (Lat. *avis*, a bird), a structure erected for the purpose of keeping birds in captivity. It is stated that they were erected first by the Romans.

**Aviation**, see AERONAUTICS; AEROPLANE; AERODYNAMICS; AERO ENGINES; AIR MAIL; ATLANTIC FLIGHTS; AVIATION, CIVIL OR COMMERCIAL; SCHNEIDER TROPHY.

**Aviation, Civil or Commercial**. Civil A. received a great impetus from the First World War through the accelerated development of aeroplanes and the ever-increasing number of aviators. During the actual period of the war, civil A. was of course restricted, but when in 1919 it was possible to remove the restrictions, commercial services, and experimentation again went ahead. During the war the Air Council were invited by the Gov. to consider the development and regulation of civil aerial transport from the international standpoint. The council, through special committees, investigated questions of law and policy; technical and practical questions as to the powers of aircraft and



the requirements of aerial service; commercial outlook of the aircraft manufacturing industry; labour questions; and scientific research. (See *Reports of The Civil Aerial Transport Committee*, 1918. Cd. 9218.) An International Air Convention was signed in 1919 by all allied and associated powers (and, later, a number of other nations subscribed to it), the chief value of which was in co-ordinating the regulations for air traffic. Subsidies, long-distance demonstration flights, and foreign missions were among the methods used by various states to encourage civil A. and to secure public confidence in its future. Development in late enemy countries was retarded by disturbed political conditions, financial stringency, and the provisions of the peace treaties forbidding manuf. and importation of aircraft and accessories in ex-enemy countries for 6 months after the ratification of the treaties. In 1919 (Aug.) the first regular commercial service between London and Paris was estab. by the Handley-Page Company. A mail air service was instituted with Belgium during the same month. By the end of that year not far short of 1000 passengers were carried on the London-Paris route and about £100,000 worth of goods over the routes to France and Belgium. Before the end of 1920 at least 100 aerodromes had been licensed by the Gov., the first customs aerodrome being at Hounslow, others being organised at Cricklewood, Felixstowe, and Lympne. The Hounslow aerodrome was eventually removed to Croydon, which became the metropolitan terminus of commercial and civil flying from and to England.

Civil A. has undergone remarkable developments in the U.S.A., and even before the Second World War exhibited the greatest system in the world, with the possible exception of Germany. This development was due to the vast service of air mail which covers the U.S.A. like a network, and directly contributed to the growth of the nation's enormous commercial plane industry. None the less Brit. commercial machines, operated by Imperial Airways, continued to increase both the number of their journeys and their total mileage: whereas, e.g. in 1924-25 (the year of the inauguration of Imperial Airways), the total mileage flown by Brit. commercial machines was 853,000, it was over 5,000,000 m. in 1936-37. For further particulars of air mails, see AIR MAILS.

Practically all countries subsidise their air mails, either directly or by a hidden subsidy. In 1928 the Air Navigation (Financial Provisions) Act was passed, which, in pursuance of the recommendations of the Cadman Committee, increased the air transport subsidy from £1,500,000 to £3,000,000 (maximum). Expenditure in Great Britain on civil A. in 1936-37 was £215,600 (the total civil A. vote) and the direct subsidy was £291,000. As against this total, Germany was reported to have expended in 1934-35 (later figures are not available) £10,000,000—

but how far these figures can be regarded as reliable is conjectural. Next in order, in 1936-37, came the U.S.A., with £6,000,000; Italy, £805,000; Japan, £666,000; and Poland, £378,000.

*Brit. Civil A. during and after the Second World War.*—The war, perforce, gave a great impetus to air travel by civilians, not only by reason of the striking advances in aircraft development but because sea travel was too hazardous and shipping scarce. Early in the war it was realised by most govts. that civil A. after the war would undergo a vast expansion, with consequently keen international competition. Under an Act of 1939 the Brit. Gov. estab. the Brit. Overseas Airways Corporation (B.O.A.C.), not only to operate such services as the secretary of state for air required, but also to secure the fullest post-war development, consistently with economy, of overseas air transport services. The following year the Corporation acquired the air transport undertakings of Imperial Airways and Brit. Airways, which had been at the disposal of the secretary of state for air since the outbreak of war, and those 2 concerns accordingly went out of existence. During the war little could be achieved, but in Oct. 1944 the Ministry of Civil A. was instituted to take over the functions of the secretary of state in relation to B.O.A.C. to deal with aerial transport generally, both home and overseas and also with civil research and production. Early in 1945 the Brit. Gov. proposed to set up 3 sev. corporations for the empire, Europe, and Lat. America, with directorates appointed by the Ministry of Civil A. and linked together not only by the participation of B.O.A.C. in all three, but also by a common organisation in the overhaul of aircraft and a common school for the training of crews and technicians. Accordingly shortly after the war 2 new corporations were formed within B.O.A.C.—Brit. European and Brit. S. Amer. railway companies and shipping firms were excluded from any participation in the ownership of the new corporations for those regions, though they put their experience and preliminary organisation at the disposal of the Gov. It was evident that Brit. civil A. would ever, where have to challenge comparison with formidable Amer. achievements, especially as the Amers. had always insisted on the principle of entrusting air services to companies with no surface interests, whereas Brit. policy was to exploit Brit. enterprise and initiative in other forms of transport. At a conference in Bermuda (Feb. 1946) arrangements were made for the co-operation of the Brit. and Amer. Govs. in their common aim, defined as 'the widest possible distribution of the benefits of air travel for the general good of mankind at the cheapest rates consistent with sound economic principles,' and the conflicting principles of policy mentioned above were harmonised by the expedient of working on a schedule of international routes of interest to both Govs. In 1946 B.O.A.C. announced its 6 main services—the

Kangaroo to India, Australia, and New Zealand; the Tiger to the Middle E. and S. Africa; the Dragon to the Far E.; a W. African service; and a double N. Atlantic service to Montreal and New York. The Kangaroo was scheduled to run 4 times a week, the N. Atlantic service twice a day, most of the others approximately daily. Fares ranged from under £100 for the N. Atlantic to £131 to Johannesburg, £220 to Sydney and £187 to Tokyo. The European services were handed over to B.O.A.C. as trustee for the projected Brit. European Airways. Regular services on the S. Amer. route began in the spring of 1946. The aircraft available for the regular Brit. lines at the beginning of 1946 were discouraging—Brit. military types and foreign transports were being acquired and recourse was had to civilian modifications of military types. The position in regard to airports was also bad, but prospects for 1947-48 were promising. Heathrow was designated soon after the war as the airport for long-distance flights; and while it was being prepared, Hurn was the alternative, while Northolt, released by the R.A.F., was to replace Croydon as the terminal of the European routes. It was obvious at this time that conditions altogether precluded Brit. civil A. from being able to exist independently of Gov. support for some years; for only through the Gov. could it get aircraft and the use of airports and would have to rely on a Gov. subsidy for some time unless it were subsidised by the railways or shipping companies which was deemed impracticable. It was also equally clear thus early that Brit. civil A. would have to meet strong competition from Amer. airlines, though it was less certain whether that competition would be the open warfare of rate-cutting and uneconomic subsidies, but these subjects were among those discussed and tentatively settled at the Bermuda conference.

See further under AIRWAYS, BRITISH; AIRWAYS, IMPERIAL; and for record flights, see AERONAUTICS; ATLANTIC FLIGHTS; CAPE FLIGHTS.

**Avicebron**, Salomon ben Gabirol (1020-1070), Jewish poet and philosopher, b. at Málaga, educated at Saragossa, and d. at Valencia, after a wandering life. His great work, *Fons Vitæ*, written in Arabic, was trans. into Lat. by Gondisalvi, and influenced Erigena, Amaury de Bène, David de Dinan, Roger Bacon, and Giordano Bruno, and was fiercely opposed by Thomas Aquinas. Some of his short poems are preserved in the Jewish liturgy. See Kaufmann's *Studien über S. Ibn Gabirol*, 1899.

**Avicenna**, an Arabian philosopher (980-1037). He was b. at Afshena in Bokhara. During his youth the family migrated to Bokhara, then famous for its culture among Moslem cities. Under a tutor his marvellous progress excited universal wonder and envy. Before he was 16 he had mastered the Koran, much Arabic poetry, the *Isagoge* of Porphyry and the first propositions of Euclid, besides a thorough knowledge of

medical theory and the discovery of certain new cures. He encountered much difficulty in the study of more recondite philosophy, but invariably had recourse to prayer, with what success is not known. Varying fortunes followed till he reached the office of vizier. Insurrections, however, made the office insecure. A love of enjoyment proved so harmful to his constitution that he d. From the twelfth till the seventeenth century he was the guide of medical study in European univs. He owed his reputation to a treatise, *Canon of Medicine*. About 100 treatises are attributed to him.

**Avicennia**, a genus of tropical plants of the order Verbenaceæ. *A. tomentosa* is the white mangrove, used in Rio de Janeiro for tanning; *A. resinifera* is a native of New Zealand; *A. nitida* grows in Martinique.

**Avicula** is the name given to a genus of marine bivalves of the order Pseudomacellibranchia, with pearly shells. It derives its name ('little bird') from the wing-like expansions of the hinge which occur in typical species. It is allied to the pearl oysters, and in some classifications includes them.

**Avienus**, Rufus Festus, a Lat. poet, who probably flourished in the fourth century A.D. The only knowledge of his life that we have is derived from an inscription, printed in Meyer's *Anthologia Latina*, which is supposed to refer to him. He wrote on geographical and astronomical subjects, chiefly in hexameters, the latter including a translation of Aratus's *Phænomena*. He is supposed to be the Festus who was proconsul in Africa in 366, and in Achaia in 372.

**Avifauna**, a collective term applied to the various kinds of birds found in any country or dist.; the fauna as regards the birds of that region.

**Avigliano** is the name of a tn. in the lt. prov. of Potenza, 8 m. N.W. of the tn. of that name. It manufs. explosives, and cattle-breeding flourishes. Pop. 17,440.

**Avignon** is a city of Provence, cap. of the Fr. dept. of Vaucluse, situated on the l. b. of the Rhône, 75 m. N.W. of Marseilles. It was anciently Avenio, a tn. of the Cavares, a Gallic tribe, and there are numerous relics of Rom. times. The tn. and dist. afterwards belonged to the popes and were governed by a papal legate from 1348 to 1797, when France regained possession. It was also from 1309 to 1377 the residence of the popes, and from 1378 to 1418 the Fr. anti-popes dwelt there. Two ecclcs. councils were held there, in 1326 and 1337. The tn. is still surrounded by high crenellated walls dating from the fourteenth century, save on the N. side, where the Rocher des Doms, 200 ft. high, rises from the Rhône. The famous 'broken bridge of Avignon,' immortalised in the children's song, 'Sur le pont d'Avignon tout le monde y danse en rond,' was built across the Rhône, 1177-85, and has been in ruins since 1669. On one of the piers stands a chapel, 1234-37. There is the eleventh-century cathedral of Notre-Dame, with its papal throne, and

near by a papal palace, built in 1339. There are a multitude of churches in the tn.; Rabelais called it 'la villesomnante.' A univ. was founded in 1303, but abolished in 1794. The tn. is the seat of an archbishop, and contains a museum, picture gallery, and statues to Crillon, Petrarch, and do Girard. It manufs. paper, silk, leather, iron, etc., and is famous for its garden produce, and also produces fruit, wine, honey, etc. Pop. 60,000.

16 m. N. of Oviedo. Manufs. of earthenware, linen, etc.; there are near at hand coal and copper mines. Pop. 16,500.

Avion, tn. and com. in the Ribadavia dist. of Orense prov., Spain. Pop. of com. about 5000.

Avison, Charles (a. 1710-70), musical composer, b. at Newcastle-on-Tyne. Studied under Geminiani. Pub. numerous concertos, a few of which have been repub. in recent times, and many sonatas.



AVIGNON

The cathedral and palace of the popes with the Pont Saint-Bénézet—'le pont d'Avignon.'

Avila, a tn. of Spain, cap. of the prov. of the same name, 70 m. N.W. of Madrid. It is an anct. place, and its Moorish walls and towers are in a state of very good preservation. It possesses also a fine Gothic cathedral and a Moorish castle, and is the bp. of St. Teresa (q.v.). Pop. 15,200. The prov., which is part of Old Castile, is mountainous, having fertile valleys. Its mineral wealth is untouched, but it produces timber, chestnuts, and olives. The area is 2981 sq. m., and pop. 236,000.

Avila, Juan de, a Sp. mystic writer, was b. in La Mancha in the year 1500. He passed 20 years as a priest, and left sev. works which were pub. by Ruiz de Mesa in 1618. He has been called 'the apostle of Andalusia.' See Rousselet's *Les Mystiques espagnols*, 1867.

Avila, Sancho de, was a Sp. general who served under the duko of Alva. He defeated Louls of Nassau, and captured and sacked Antwerp in 1576. He was killed in 1579 at the siege of Maestricht.

Aviler, Augustin Charles d' (1653-1700), a Fr. architect, was b. at Paris. He was captured by pirates and taken to Tunis, where he designed a mosque. Having been set free, he studied at Rome under Mansard. He designed numerous edifices, including the archiepiscopal palace at Toulouse, and wrote many works on architecture.

Aviles, the anct. Flavionavia, is a seaport of Spain, in the prov. of Oviedo, and

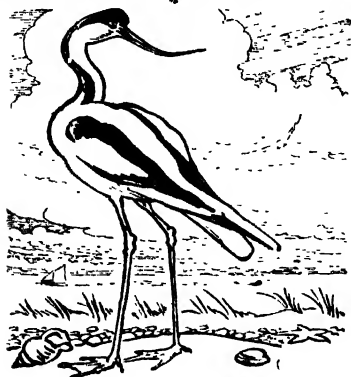
His *Grand March* for harpsichord revived his name a century after his death, as one of the characters of Browning's *Parleyings with certain People of Importance in their Day*.

Avisseau, Charles Jean (1796-1861), a Fr. potter, b. at Tours. He was apprenticed to his father, a stone-cutter and potter, until 1816. After suffering privation and poverty, he succeeded in discovering the secret of firing coloured enamels at a high temp., so as to fix the colour permanently with no diminution in durability and beauty, a process which had been lost since Bernard Palissy. He refused to enrich himself by making forgeries of old *objets d'art*. His son Edouard succeeded him in the business on his death.

Avitus, Marcus Mæcilius, the date of whose birth is uncertain, was a well-born native of Auvergne. He was prefect of Gaul, and waged successful war against the Huns and the Vandals. After having been ambas. at the court of Theodoric, king of the Visigoths, he became emperor of the W. in A.D. 455 at the death of Maximus. He was, however, deposed after having been on the throne 14 months, by Ricimer, who appointed him bishop of Placentia. He d. in 456.

Aviz, is a Portuguese tn. in the prov. of Alentejo, situated on a small trib. of the R. Seda bearing the same name. In anct. times it was the seat of the order of Aviz. Pop. 7400.

**Avizandum** is a Scottish legal term. When the judge, after hearing a case, temporarily withdraws it for private consideration, or for some other reason, he is said to withdraw it *ad A.* In England he would be said to reserve judgment.



**Avlona** or **Valona** is a tn. and seaport of the state of Albania on the bay of Janina, 58 m. S. of Durazzo. It was under the gov. of Venice until 1691. It is an archiepiscopal see of the Gk. Church, and a station for Lloyd-Triestino steamers. Normally there is a large trade in oil, salt, and tortoise-shell. It demands on Austria-Hungary, as formulated in Apr. 1915, included recognition of her sovereignty over A. At the same time Italy was signing a secret agreement with the Allies whereby, *inter alia*, she was to annex A. and its neighbourhood. In May the dual monarchy made a belated offer of the sovereignty of A., together with a free hand in Albania as a whole; but the war spirit in Italy would brook no further negotiations (*see also under AUSTRIA*). In Dec. 1915 the Its. occupied A., together with Durazzo, but were compelled to evacuate the latter under the fire of the Austrian guns. They successfully held A., which was thus secured as a base to dominate all the S.-central part of Albania. After the downfall of Italy in the Second World War, the Allies set up a provincial gov. of Albania under Gen. Enver Hodja and A. therefore reverted to Albanian possession. Pop. 10,000.

**Avoca**, or **Ovoca**, is a short riv. of co. Wicklow, Ireland, formed by the junction of the Avonmore and Avonbeg streams. It runs through exquisite scenery, the 'sweet vale' of Thomas Moore's *Meeting of the Waters*.

**Avocado Pear** is the edible fruit of *Persea gratissima*, a species of Lauraceæ, which grows in the tropics. It is also known as the alligator pear.

**Avocet** is the name of a widely distributed wading bird belonging to the genus *Recurvirostra*, characterised by its curious

curved beak. The common A. bred in England till 1824, but then disappeared from England until 1947 when one bird returned and reared a family of 14 near Great Yarmouth. The genus is related to the snipe family and inhabits fen areas. It is found in Europe, Africa, and Central and S. Asia.

**Avogadro**, Count Amedeo (1776-1856), It. physicist, was made prof. of physics at Vercelli in 1809, and of mathematics at Turin in 1820. He enunciated in 1811 the hypothesis named after him: that equal vols. of gases at the same temp. and pressure contain equal numbers of molecules. This hypothesis is an important part of the atomic theory (*q.v.*).

**Avoldupols** is the name given to a system of weights and measures applied in Great Britain, Ireland, and the U.S.A. to all goods save metals, precious stones, and drugs. *See WEIGHTS AND MEASURES*.

**Avola** is a port on the E. coast of Sicily, about 20 m. S.W. of Syracuse. The 'honey of Hybla' comes from this neighbourhood. It produces wine, sugar, and almonds; tunny fishing is carried on, and a trade in agric. produce. Pop. 22,000.

**Avon**, a Celtic word meaning river, the name of many Brit. streams, of which the following are the chief: (1) The Upper or Warwickshire A. rises near Naseby in Northamptonshire, and flows through Warwickshire and Worcestershire into the Severn. (2) The Lower or Bristol A., 70 m. long, enters the Bristol Channel 6 m. below Bristol. It is noted for its very high spring tides, which sometimes reach a height of 40 ft. (3) The E. A. flows through Wiltshire and is navigable to Salisbury. It has a length of 50 m., and is noted for the delicate loach. There are also 3 As. in Scotland, tribs. of the Spey, the Clyde, and the Forth, and 2 in Wales, which flow into Swansea Bay.

**Avondale**, a par. of W. Lanarkshire, Scotland, 9½ m. S.W. of Hamilton. Famous as containing the scene of the battle of Drumclog, 1679. *See Scott, Old Mortality*. Pop. 6000.

**Avonmouth**, tn. of Gloucestershire, England, at mouth of Avon, 6 m. N.W. of Bristol. A rapidly increasing port with extensive docks. Pop. 3000.

**Avory**, Sir Horace Edmund (1851-1935), Eng. judge, b. in London; educated at King's College and Cambridge Univ. Called to the bar, 1875; junior counsel to Treasury, 1889; senior, 1899. K.C. 1901. Appointed a judge of King's Bench Div., 1910. Generally accounted the ablest criminal lawyer of his day. Had the reputation of an extremely stern judge and absolutely fair. It fell to his lot to try most of the worst criminals of his time—murder cases tried by him included those of Mahon, Vaquer, Brown and Kennedy, Field and Gray, Allaway, and Volsin. The Hatry case was also heard by A., and he also presided over the trial of Lord Kylant. As Crown counsel he prosecuted Adolf Beck, and it seems that the miscarriage of justice in that *cause célèbre* which led ultimately to the institution of the Court of Criminal Appeal

(q.v.) was due chiefly to his scrupulous wish that the laws of evidence should be observed. See Gordon Lang, *Mr. Justice Ivory*, 1935.

**Avranches**, tn. of Manche, France, on R. Sée, 35 m. E. of St. Malo; pop. 7100. It was an episcopal city till 1790, the cathedral having been consecrated in 1121. In it Henry II. of England received absolution for the murder of Becket. It was destroyed at the time of the first Fr. Revolution. The chief industry is leather-dressing. A. was the scene of decisive engagements in the Second World War. In July (1944) the Amers.' first task, after the capture of St. Lô, was to clear the W. of the Cotentin peninsula down to its S. limit at A. With large forces of tanks, preceded by low-flying aircraft and followed by motorised infantry and guns, they captured their goal on July 31, and made simultaneous threats—E. to Mortain, W. to Dinan, and S. to Rennes, and soon reached all 3 places. The reply of the Gers., who had been caught napping, was a counter-offensive with tanks towards A., the object being to cut the Amer. line in two; but though the Ger. counter-offensive reached, retook, lost, and again retook Mortain, it could not succeed further. See also WESTERN FRONT IN SECOND WORLD WAR, BATTLE OF NORMANDY.

**Awaji**, or **Awadsi**, an is. of Japan, in the strait at the E. entrance of the Inland Sea between Honshu and Shikoku. Much visited by tourists for its beautiful scenery. Chief tn. A. Length 30 m.; area 218 sq. m.; pop. about 200,000.

**Award**, the decision of an umpire in a submission to arbitration (q.v.). To be enforceable, the A. must determine all the differences at issue and no others.

**Awe**: 1. Loch in Argyllshire, Scotland, about 23 m. long and 1½ sq. m. in area. It is fed at the N.E. end by the Orchy and Strae. The scenery at this end is very fine, and on a peninsula, at high water an is., stands Kilchurn Castle. 2. Riv., issuing from the N.W. end of Loch A., and flowing about 5 m. into Loch Etive. It is an excellent salmon and trout stream.

**Awomori**, or **Aomori**, a seaport of Japan and chief tn. of the dept. of A., on N. coast of Nippon, 444 m. N. of Tokyo. It has a fine natural harbour, and a large trade, mainly local. Pop. 77,100.

**Ax**, a tn. of Ariège, France, on R. Ariège, 74 m. S.E. of Toulouse. It is noted for its hot sulphur springs, numbering about 80, with temps. of from 77° F. to 172° F. Pop. 1300.

**Axbridge**, a par. and small tn. in Somersetshire, 9½ m. W. of Wells on the Great Western railway; pop. about 1000.

**Aze**: 1. Riv. of Dorset and Devon, England, about 21 m. long, flowing through Axminster into the Eng. Channel at Lyme Bay. Not navigable. 2. Riv. of Somerset, England, about 25 m. long, rising in the Mendips and entering the Bristol Channel.

**Axel**, Dan. statesman, see ABSALON.

**Axel**, a tn. and fortress in the prov. of Zeeland, Holland, situated 17 m. N.E. by N. of Ghent; pop. 6300.

**Axenbergl**, a mt. in Uri, Switzerland, to the S.E. of Lake Lucerne. Alt. 3670 ft. On a ledge of rock at its foot stands Tell's chapel. The road called the Axenstrasse has been hewn out of the rock, and the mt. is pierced by a tunnel on the St. Gothard railway.

**Axestone**, see JADE.

**Axholme**, Isle of, a low-lying dist. of N.W. Lincolnshire, England, cut off by the Rs. Trent, Idle, and Don. Area 47,000 ac. It was probably originally covered with forest, and when this was destroyed, became a swamp, drained 1625-30 by Cornelius Vermuyden. There are still traces among the inhab. of the Flemish settlement at this time. Chief tns., Crowle and Epworth.

**Axil**, in botany, the upper angle between a leaf and the stem or branch from which it grows. Lateral buds usually grow out from the A., and are accordingly called axillary buds.

**Axilla**, the anatomical term for the armpit, or pyramidal space between the inner side of the upper arm and the wall of the chest. The apex of the cavity points upward and inward towards the root of the neck, and its extent depends on the position of the arm, being greatest when it hangs at the side. When the arm is raised, the fore and hind boundaries form the axillary folds. The skin of the A. is dark and covered with large sweat-glands and hair. Large nerves and vessels of the arm pass through it, and there are numerous lymphatic glands.

**Axim**, a vil. and fort on the Brit. Gold Coast of W. Africa, situated about 2° 15' W. long. It was acquired from Holland in 1872. It is well supplied with water, and is the healthiest place on the coast. Pop. 3500.

**Axinite**, the name of a mineral which is a silicate of aluminium, lime, etc., with boracic acid, containing varying amounts of iron and manganese. It derives its name from the fact that the edges of its glassy triclinic crystals bear some resemblance to the edges of an axe.

**Axiom**, a self-evident proposition which may be taken for granted and requires no proof. The use of the word is now practically restricted to the general premises on which the truths of geometry rest. The term was so employed by Euclid, following Aristotle. Plato limited it to specifically geometrical truths.

**Axis**, an imaginary line about which a body rotates, or is symmetrically disposed. The term has many special meanings in the various sciences. It is of frequent use in geometry, e.g. the A. of symmetry is the line joining corresponding points in symmetric figures; the A. of a solid is the line about which its angles are symmetrically disposed; the transverse A. of a conic passes through its foci; and there are similar uses in geometric crystallography and physics. In mechanics the term axis has the same meaning. As an anatomical term it denotes the second cervical vertebra, which supports the atlas.

**Axis**, in botany, is a term which is applied to the root and stem of the whole plant. When a seed has begun to germinate the plumule ascends into the air above the ground, while the radicle descends into the earth. The former is said to be the ascending A. of the plant, the latter the descending A., and around these axes of growth all other parts of the plant are arranged.

**Axis Deer**, a species found in India and the E. Indies, somewhat resembling the common European fallow-deer, being profusely spotted with white on a fawn background, shading from almost black on the back to white on the under-parts. The male has slender, pointed horns, not branched. It is easily domesticated.

**Axis, Rome-Berlin**, the political and, later, military entente between Hitler and Mussolini, concluded, ostensibly, to present a common front against Bolshevism, but really as an essential factor in the formulation of a common policy against the W. democracies in order to secure the nullification of the treaty of Versailles. In Aug. 1937, Mussolini, speaking at Palermo, said: 'Another reality of which account must be taken is that which is now commonly known as the R.-B. A. One does not reach Rome by ignoring Berlin, and one does not reach Berlin by ignoring Rome. There is an active solidarity between the two regimes. Let it be said in the most categorical manner that we will not tolerate in the Mediterranean Bolshevism or anything of a similar nature.' The term A. became a common description for the countries allied to Germany in the Second World War. See further under EUROPE, *History during the European War* (1939); GERMANY, *History*; ITALY, *History*; JAPAN, *History*.

**Axis**, a riv. of Macedonia, which rises in the mt. range connecting Mt. Scardus and Mt. Orbelus, and runs S.E. into the gulf of Salonika. It was called Bardarion in the Middle Ages, and the modern name, Vardar, is a corruption of this. In the upper part of its course it runs through narrow valleys between high mts. At its mouth alluvial deposits have made great encroachments, and the land is low and swampy, intersected with small creeks, the main branch being therefore very difficult to discover. The entrance is very intricate, but the riv. is navigable for boats of 30 tons for sev. miles. The depth of the riv. depends on the season of the year. It is as low as 4 ft. in summer, but in winter it is deep and rapid, and nearly 2 m. in breadth before reaching the sea.

**Axminster**, tn. of Devonshire, England, on R. Axe, 24 m. E. of Exeter. It was long celebrated for its carpets, the manuf. of which was begun in 1755. The industry has now moved to Wilton, and the chief industries of A. are the manuf. of brushes, textiles and leather goods, corn milling, and iron-working. The minster from which it takes its name is said to have been founded by King Atheistan, and it was evidently an important place in early times, standing as

it does at the intersection of Icknield Street and the Fosse Way. Pop. 2300.

**Axolotl**, a larval salamander of the genus *Amblystoma*, found in lakes in Mexico and the Rockies. It resembles a newt in shape, having a powerful tail, 2 pairs of weak limbs, and 3 pairs of simple external gills. In this form it breeds freely, laying eggs like a frog's, in strings attached to water-plants by a viscous substance, and the young, hatched in 2 to 3 weeks, resemble the parents. This was originally supposed to be the life hist. of the species, but from 1865 onwards experiments made in Paris proved that this form is prematurely sexual, and that the *Amblystoma* is capable of attaining an adult form in which gills and the tail-membrane are lost. The offspring of these, the full A.s., are gilled. Some kinds of the species never appear to make this change, which can be favoured or prevented by the conditions of life.

**Axona**, see AISNE.

**Axum**, anc. tn. of Tigré, Abyssinia, 85 m. N.W. of Antalio; now mostly in ruins, which include some very fine specimens of Gk. architecture. It was formerly cap. of an Ethiopian kingdom, and, after the adoption of Christianity in the fourth century, an eccles. centre. It is still regarded as a sacred city by the Abyssinians, and the anc. chronicles are kept in the church. The city surrendered to the invading It. forces under Gen. de Bono on Oct. 15, 1935. The possession of this traditional centre of Ethiopian life was of considerable importance to the Its., the more so from the fact that it had been the centre of religious celebrations for the Ethiopian victory of 1896. But the Its. wished to avoid wounding the religious susceptibilities of the pop. by occupying by force of arms a holy city in which, according to tradition, there still rested the ark of the covenant which had been brought from Jerusalem by the son of King Solomon and the queen of Sheba. Hence the It. problem was conveniently solved by a deputation of priests, headed by their political and religious chief, the Nevraid, coming out and delivering the keys of the city to the It. commander. Pop. 5000.

**Ay**, a tn. of Marne, France, on R. Marne, 14 m. S. of Rheims. The chief industry is vine-growing, the tn. being especially famous for its champagne. Pop. 6000.

**Ayacucheo**: 1. Dept. of S. Peru. It is watered by the Apurimac. There was formerly much gold-mining in the dist. Area 18,185 sq. m.; pop. 359,000. 2. Cap. tn. of dept. of same name. 220 m. S.E. of Lima. Pop. 20,000. It was founded by Pizarro in 1539, and the name, originally Guamanga, was changed to A. in commemoration of the victory gained at a small place of that name over the Spaniards in 1824.

**Ayala**, Adelardo López de (1828-70). Sp. dramatist and politician. He was president of the chamber under Alfonso XII., but his political life was marked by confusing changes of opinions. Chief

dramas, *El tanto por ciento*, 1860; *El nuevo Don Juan*, 1863; *Consuelo*, 1878.

**Ayala, Balthazar** (1548-84), jurist, son of Don Diego de A., of Burgos in Spain, and of his wife, daughter of an alderman of Antwerp, where Balthazar was b. He was made 'auditor' or judge-advocate of the troops of Philip II. in the United Provs., in May 1580. In 1583 he became also member of the great council and master of requests in ordinary. The only work he pub. was *De Jure et Officiis et Disciplina Militari*, libri iii., 8vo., Douai, 1582. An Eng. translation has fairly recently appeared in America. He d. at Alost, Aug. 1584.



**Ayala, Pedro López de** (1332-1407), Sp. poet and historian, b. at Murcia. Fought for Henry of Trastámara at Nájera, 1367, and was captured by Eng.; later member of council of Henry II. of Castile and high chancellor to John I. His best work is the *History of Castile*, 1350-96, and he also trans. Livy into Sp.

**Ayala, Ramón Pérez de**, Sp. author; b. 1881, at Oviedo, Asturias. He wrote 4 prose vols. of disguised autobiography: *Tinieblas en las Cumbres* (1907); *A.M.D.G.* (1910); *La Pala de la Raposa* (1912); and *Troteras y Danzadoras* (1913). The theme of the first is the same as that of Bernard Shaw's *Mrs. Warren's Profession*; the second is an indictment of schooling in a Jesuit college; the third, a study of psychological paralysis. In 1921 he pub. a very popular and humorous novel called *Belarmino y Apolonio*, about 2 cobblers, one with an artistic and the other with a philosophic ideal.

**Ayamonte**, a fortified tn. in the Sp. prov. of Huelva, on the l.b. of the Gadiana; there is a good harbour, and cod, sardine, and tunny fisheries. Pop. 10,000.

**Aydin**, a vilayet of Turkey, 80 m. S.E. of Smyrna. The most important centre of the country for production of olive oil. Pop. 201,000.

**Aye-aye** (*Chiromys madagascariensis*), is a rare and remarkable animal found in the woods of Madagascar. Formerly

regarded as a rodent, the memoir of Owen made it clear that it is really an aberrant lemur with many rodent affinities. It is the size of a cat, has rodent-like teeth, and a hairy hand with an exceedingly slender third finger, which is used to pick out the wood grubs on which it feeds. It is exclusively nocturnal and arboreal in its habits, and is regarded with superstitious reverence by the natives of Madagascar.

**Ayeen Akbery**, properly **Ayīn-i-Akbarī**, the title of a geographical and statistical account of the Mogul empire in India during the reign of Jelal-ed-din Mohammed Akbar, written by his vizier, Abul Fazl. It constitutes properly the third or concluding part of the *Akbar Nameh* of the same author, which gives an account of Akbar's ancestors and his reign down to the forty-seventh year. The *Ayīn-i-Akbarī* is divided into 4 parts; the first 3 are chiefly political and legislative; the fourth part is chiefly statistical and geographical, with an account of the anct. institutions, religion, and literature of the Hindus. Francis Gladwin made a free and abridged translation into Eng. of the *Akbarnameh* (Calcutta, 1783).

**Ayenbite of Inwyt**, *The*, meaning *The Remorse of Conscience*, is a famous translation, made in 1340 by the Augustinian monk, Dan Michel, of *La Somme des Vices et des Vertus*, by Frère Lorens. Chaucer is supposed to have made use of it for *The Persones Tale*; it is the best example of Kentish S. Eng.

**Ayesha** (610-77), the favourite, but childless, wife of Mohammed, was b. at Medina. On Mohammed's death in 632, she prevented the prophet's son-in-law, Ali, from becoming caliph, and secured the succession for her father, Abu-Bekr. She again tried to prevent Ali on the death of the Caliph Othman, but in 656 was taken prisoner. She d. at Medina.

**Aylesbury**, a mkt. tn. in Buckinghamshire, 38 m. N.W. of London, and an important railway centre. It is built on high ground, and overlooks the fruitful valley of A. It has many interesting public buildings. The cruciform par. church was restored between 1849 and 1867; the corn exchange and markets in 1865, and the co. infirmary in 1862. In anct. times it was captured from the Brit. by the Saxons in 571, and in the Civil war a battle was fought near here in 1642. Until 1885 it was a parl. bor., and with its 'hundred' returned 2 members. There are printing works, and manufs. of straw plait and condensed milk. The locality is noted for rearing ducks for the London market. A. is the assize tn. for the co. as well as the co. tn., having supplanted Buckingham. Pop. 13,400.

**Aylesbury, William** (1615-56), educated at Christ Church, Oxford. His main work was a translation of Davila's *History of the French Civil Wars* from the It.

**Aylesford**, a: Eng. vil. in Kent, 3½ m. N.W. of Maidstone, on the r. b. of the Medway. The anct. church of St. Peter, which was restored in 1878, has fifteenth-century brasses, and an early embattled

tower. In the dist. are many monuments of anct. times, including the ruins of a Carmelite friary, cromlechs, and the 'countless stones.' The supposed tomb of Horsa is also to be seen, and here Alfred the Great conquered the Danes. Pop. 3700.

**Aylesham**, a vil. of Kent, England, some 4 m. from Dover. It is a garden city for colliers. Pop. 3000.

**Ayliffe**, John (1676-1732), was b. at Pembr in Hampshire, and educated at Winchester and at New College, Oxford. He was an advanced and zealous Whig, and was expelled from the univ. and deprived of his degrees for stating in one of his works that the funds of the Clarendon printing house had been misappropriated. His treatise on canon law appeared in 1726, and is still a high authority, whilst his unfinished treatise on civil law is the most elaborate one written in Eng. on Rom. law.

**Ayllon**, Lucas Vázquez de (c. 1476-1525 or 1530), Sp. soldier and explorer; b. probably in Toledo. Was a captain and a rich and learned man. Made *auditor de guerra* or legal adviser to the viceroy of Hispaniola, No Nicolás de Ovando, whom he accompanied in Feb. 1502 in the largest expedition yet dispatched to the new Amer. lands. Formed a company with some other inhab. of Hispaniola and sailed out with 2 vessels to capture Indian Caribs as slaves for the mines. Storm-driven on E. coast of Florida, A. entered the prov. of Chicora and by treachery captured 130 natives, most of whom died of homesickness. In 1524 he prepared another expedition to conquer Chicora and landed on another part of the coast. The Spaniards were received with feigned hospitality and most of them murdered. Some say A. was amongst those slain; others that he d. of fever. See Gabriel de Cardenas y Cano, *Ensayo Cronologico de la Florida* (Madrid), 1723; Arthur Hays, *The Spanish Conquest in America*, 1855.

**Aylmer**, a tn. in Quebec, Canada, on Lake Deschenes, 8 m. from Ottawa. Has saw-mills and nickel-refining industries. Pop. 3000.

**Aylmer**, John (1521-94), was b. at A. Hall, Tivetshall St. Mary, in Norfolk. He was educated at Cambridge, and in 1541 became chaplain to the duke of Suffolk. Afterwards, when archdeacon of Stow, he was obliged to leave the country on account of his opposition to the doctrine of transubstantiation, but returned to England and resumed his office on the accession of Elizabeth. In 1562 he was made archdeacon of Lincoln, and in 1576 bishop of London. He was avaricious, and notorious for his severe treatment of any who differed from him.

**Aylmer**, Matthew Whitworth, Baron (1775-1850). Twenty-ninth governor-general of Canada (1831-35). B. May 24, 1775, a general in the army and colonel of the 18th Foot. His tenure of office followed the conciliatory policy of Sir James Kempt on the question of the constitution of the Executive and Legis-

lative Councils. A. had had a distinguished military career, but no administrative experience. Hence he approached this question with at least an open mind, as indeed all constitutional problems in Canada. His administration was characterised by a series of measures which profoundly altered the aspect of the outlook of the Fr.-Canadian party, driving it to a clear-cut policy which led to open violence. In 1834 the Assembly voiced its grievances in the '92 Resolutions,' which document was sent to the Brit. Gov. in London. A royal commission then investigated the affairs of Quebec, and recommended that its revenue should be handed over to the Assembly in return for a 'civil list,' but that there should be no legislative council. This negative recommendation completely alienated the Assembly, and A. was recalled. It was during his tenure, too, that the *Royal William*, the first steamship to cross the Atlantic, was launched from its Canadian shipyard. Again, it was A. who caused a memorial to Montreal to be placed in the Ursuline convent chapel of Quebec city. Sov. tns., lakes, etc., in Canada are named in memory of him.

**Ayliffe**, Sir Joseph (c. 1708-81), an Eng. antiquarian. He was one of the first members of the council of the Society of Antiquaries, and was later made a commissioner for the preservation of state papers. He was author or editor of a considerable number of books, among them *Calendars of the Ancient Charters . . . and of the Welch and Scottish Rolls now remaining in the Tower*.

**Aylsham**, a par. and mrkt. tn. in Norfolk, England, 10 m. S.W. of Cromer; has 2 railway stations. Pop. 2600.

**Aymaras** is the name of a tribe of S. Amer. Indians. They were in former times the inhab. of the dist. round Lake Titicaca and the adjacent valleys, but now they form the chief element in Bolivia, though the race is now of very mixed blood. In anct. days the Incas attributed the origin of all Quichua civilisation to the home of the A., which was therefore 'sacred land' to them. The A. undoubtedly appear to have possessed a considerable culture before they were conquered by the Incas in the thirteenth and fourteenth centuries. Evidence exists of their having important cities and palaces, and the ruins of Tiahuanaco show that these were of colossal size. At the time of the Sp. invasion the A. had been under the dominion of the Incas for a considerable time and were to some extent degenerate. They retained, however, the privilege of using their own language, and on the whole their treatment by the Incas suggested that the conquerors believed themselves to be of Aymara blood. The physical characteristics of the 2 races also are similar. The A. are short and thick-set, with reddish complexion, black hair and eyes, and a rounded forehead. They are of an apathetic and gloomy disposition. They now number about half a million in Bolivia; a few are also found in S. Peru.



**Aymard**, or **Aymar**, **Jacques** (b. 1662), a Fr. peasant of Dauphiné, was b. at St. Veran. He was bred a mason, but soon renounced his trade in favour of the profession of a diviner. He used his so-called powers in the finding of wells, hidden treasures, etc., but in 1692 he thrilled all France with his successful tracing of the murderer of a man and his wife at Lyons. A. discovered the criminals, a hunchback, who was broken on the wheel, and 2 others, who escaped by sea. As a result of this supposed success of his divining powers, A. was taken up by the prince of Condé, but failed miserably on being practically tested. He then confessed that his powers of divination were non-existent; but the true hist. of the Lyons affair was never discovered.

**Aymer de Valence**, **Earl of Pembroke** (d. 1324), son of William of Valence, nephew of Bishop A. (q.v.). He was appointed guardian of Scotland in 1306; defeated the Scots in that year at Methven, but was defeated by Bruce at Loudon Hill in 1307. He joined the Lancastrian party, and was a fierce opponent of Gaveston, whom he captured in 1312. He left the earl of Lancaster owing to the treacherous murder of Gaveston, to whom A. had promised his life, and was reconciled to the king. In 1314 he was made Lieutenant of Scotland, and fought at Bannockburn. In 1322 he joined in the judgment and condemnation of Lancaster.

**Aymer de Valence**, bishop of Winchester, was a half-brother of Henry III., who obtained for him the see of Winchester by putting pressure on the electors. The appointment was in every respect a bad one, for A. was ignorant of Eng., illiterate, and by no means priestly in his mode of life. He repudiated the barons' constitution at the Parliament of Oxford in 1258, and was forced to leave the country. He obtained the support of the pope, however, and was returning when he d. at Paris in 1260.

**Aymestry Limestone** belongs to the Ludlow group of the Silurian system. It is a dark grey concretionary rock, consisting of thin beds. It is named after the vil. of A., in Herefordshire, where it has long been quarried.

**Aymon** was the surname borne by 4 brothers, Alard, Richard, Guiscard, and Renaud. They occupied a prominent place as heroes of the cycle of romance in the time of Charlemagne. Their exploits were described in a romance written by Huon de Villeneuve in the thirteenth century, entitled *Les Quatre Fils Aymon*. Renaud also appears as a leading figure in Ariosto's *Orlando Furioso*.

**Ayr**, a royal, municipal, and police burgh, and the co. tn. of Ayrshire, Scotland, is a seaport 41½ m. S.S.W. of Glasgow. It is the site of a Rom. station, and here in 1197 William the Lion built a castle. Picturesquely situated on the S. bank of the riv., it has a fine bay and beautiful sands, while there are some handsome public buildings.

Its manufs. are numerous, and include leather, woollens, carpets, lace, boots and shoes, etc.; there are foundries, engineering establishments, and saw-mills. The prin. import is timber from Canada and Norway, whilst among the exports are coal, iron, and manufactured goods, and agric. produce. Ship-building is also carried on, and the harbour has both wet and dry docks. In 1873 the municipal boundary was extended to include Newtown-upon-A. and Wallace Town. At Alloway, a pleasant suburb 2½ m. S. of A., Robert Burns was born Jan. 25, 1759. Pop. 40,100.

**Ayrer**, **Jacob**, a Ger. dramatist who fl. in the sixteenth century, rivalled Hans Sachs in the copiousness of his output. He was a citizen and legal officer of Nuremberg. His works comprise 36 humorous pieces and 30 dramas. His works, both humorous and serious in character, are marked by a vigour of diction and purity of style, but the line of demarcation between the grave and the gay is often not sufficiently clearly defined. He d. at Nuremberg in 1605.

**Ayrer**, **John** (fl. c. 1680, d. 1700), was a noted calligraphist; date of birth unknown. Chiefly known as the introducer into Britain of the 'Italian' style of penmanship.

**Ayrshire**, a S.W. co. of Scotland, is bordered on the N. by Renfrewshire, on the E. by Lanarkshire and Dumfriesshire, on the S.E. by Kirkcudbrightshire, on the S. by Wigtownshire, and on the W. by the frith of Clyde. Off its coast are Ailsa Craig, Lady Is., and Rhone Is. The surface of the co. is, on the whole, undulating; there is a mountainous region of small extent in the N., and one of larger extent in the S. and S.E. Though none of the rivs. are navigable, they are famed for their varied and calm loveliness. The Ayr is the longest, 38 m. in length; among the others may be mentioned the Stinchar, the Girvan, the Irvine, the Garnock, and the Doon, whilst the Afton, the Cennock, and the Lugar are known from the poems of Burns. Agriculture flourishes in the co., having made great strides of late years, owing to green-crop husbandry and a more extensive use of manures. The co. is also noted for its dairy products, its cattle, and its horses. It is the prin. mining co. of Scotland, and iron ore and fire-clay are found in addition to coal. Its manufs. are important, and include cotton and woollen goods, lace, curtains at Galston and Darvel, cabinet-making at Beith, ship-building at Troon, Ayr, Irvine, and Ardrossan (which is also a seaport), and extensive engineering at Ayr and Kilmarnock. The area of the co. is 1142 sq. m., and its pop. 285,000.

**Ayrshire Breed**, see under CATTLE.  
**Ayrton**, **Edmund** (1731-1808), the most distinguished member of a race of musicians, was b. at Ripon. He was originally destined for the Church, but as he showed considerable musical talent he was made a pupil of Dr. Nares, the organist of York Minster. He took the degree of Mus.Doc. at Cambridge in 1784,

the Oxford degree being conferred upon him in 1788. He d. in Westminster.

**Ayrton, William Edward** (1847-1908), an Eng. man of science, entered the Indian gov. telegraphic service in 1867, and, after becoming superintendent, was made an associate of the Royal Society of London in 1881. He made many improvements in telegraphy and in the dynamometer. Mrs. A., his wife, the only woman member of the Institute of Electrical Engineers, carried out a series of experiments on the electric arc, and was awarded the Hughes medal by the society in 1908.

**Ayscough, Samuel** (1745-1804), b. of well-to-do parents, and received his education at Nottingham. Owing to family misfortunes he was compelled to labour in a mill, afterwards coming to London as an overlooker of street pavements. He afterwards became an assistant cataloguer to the chief librarian in the Brit. Museum. He is famous chiefly for his index making. He afterwards became an assistant librarian, and took holy orders. Among his numerous works are an index to the *Annual Register*, 1758-80, and an index to the *Gentleman's Magazine*, 1731-86. He also brought out the first Shakespearian concordance. He was appointed to rev. benefices, the last of which was at Cudham in Kent.

**Ayscough, William**. Very little is known of his early life. He became bishop of Salisbury in 1384, and had great influence at the court of Henry VI. He was the king's confessor in an age when it was most unusual for a bishop to occupy that position. He celebrated the marriage of Henry VI. and Margaret of Anjou in 1445. As a councillor of the king he was held to be responsible for the evil deeds of the court, and in his own diocese was disliked because of his continual absence. In 1450, after celebrating mass at Edington, he was seized by the congregation, taken to the top of a neighbouring hill, and beaten violently to death.

**Ayscue, Sir George** (d. 1671), an admiral of the Commonwealth period. He had been knighted by Charles I., but became a parliamentarian and commanded the fleet in the Irish Sea in 1649, being then appointed admiral. At the beginning of the Commonwealth he defeated the Dutch off the Downs. In 1651 he was sent by Cromwell to Barbados to reduce the Royalists to subjection. In 1652 he fought an indecisive engagement off Plymouth. He was superseded in that year, but became commander of the Swedish fleet in 1658, and a navy commissioner on the Restoration. He fought in the second Dutch war, was imprisoned in Holland in 1666-67, and on his return to England did not again take an active part in naval matters.

**Aysen**, a prov. of Chile. Area, 38,350 sq. m. Pop. 17,000.

**Aytoun, or Aytun, Sir Robert** (1570-1638), poet, b. at Kinaldie, Fife. He went to the univ. at St. Andrews in 1584, and took his master's degree 4 years later. He then went upon the usual course of travel which was considered part of a noble youth's education, and finally, in the

early part of the reign of James I. he settled at the Eng. court, where he was well received. He had previously dedicated a Lat. poem to James I. He received many appointments at the Eng. court, and in 1612 was knighted. He numbered amongst his acquaintances most of the wits of the day, and was an especial friend of Ben Jonson and Hobbes. He was one of the first of the Scottish poets to write with any degree of success in the Eng. tongue, but the poem on which his claim to fame has been chiefly based, *I do confess thou'rt smooth and fair*, has been practically proved not to be of his composition. Most of his poems were extravagant praises of contemporaries. He was buried in Westminster Abbey. Among his works may be mentioned *Diaphantus and Charidora* and *Inconstancy Unbraided* (the best of his short poems).

**Aytoun, William Edmonstone** (1813-1865), Scottish poet, b. in Edinburgh. He was descended on both sides from good families, and on his father's side was related to Sir Robert A. (or Aytun) (q.v.), who had been a poet himself. He was imbued with his love for Scottish folklore by his mother, whose knowledge of Scottish ballads was great. He was educated in Edinburgh at the academy and the univ., and at the age of 17 he pub. a vol. of poems called *Poland, Homer, and other Poems*. In 1840 he was called to the Scottish bar, and had a fair practice during the period that he remained there. He pub. a number of poems in *Blackwood's Magazine*, and in 1855, in collaboration with (Sir) Theodore Martin, he pub. the *Bon Gauthier Ballads*, which almost immediately became very popular. In 1845 he became prof. of rhetoric and belles-lettres at the univ. of Edinburgh. In 1849 he had married the daughter of Prof. Wilson (Christopher North), but she d. in 1859, and 4 years later he married again. His chief works are *Poland, Homer, and other Poems*, 1832; *The Life and Times of Richard I.*, 1840; *Lays of the Cavaliers*, 1848, a book which ran into 28 eds.; *Firmilian; or, the Student of Badajoz: a Spasmodic Tragedy* (under the nom de plume of T. Percy Jones), 1854; *Bon Gauthier Ballads*, 1855; *Bothwell*, 1856; *Poems and Ballads of Goethe*, 1858; *Ballads of Scotland*, 1870; *Norman Sinclair*, 1861; *Poems of William Edmonstone Aytun*, 1921.

**Ayub Khan** (1855-1914), Afghan prince, son of Shere Ali, formerly Ameer of Afghanistan. Took possession of Herat in 1879 after his father's expulsion from Kabul by the Brit. In 1881 he invaded Afghanistan in order to win Kandahar and the sovereignty. Defeated Gen. Burrows at the battle of Maiwand, but while hesitating to attack Kandahar, his force was assailed by Sir Frederick (afterwards Lord) Roberts and routed. He renewed his invasion soon afterwards, but after a short-lived success was utterly defeated by Abd-ur-Rahman. Ultimately gave himself up to the Brit., by whom he was sent to India as a state prisoner. He d. at Lahore.

**Ayuntamiento**, the name given in Spain

to what is practically the equivalent of the municipal councils in this country. The establishment of these councils can be traced as far back as Rom. times. They acquired great power during the struggles with the Moors, but this power fell into abeyance during the height of the Bourbon rule. See further under CARILDO.

**Ayuthia**, the anct. cap. of Siam, sacked by the Burmese in 1782, and now called Krung Krao (the old cap.). It was founded in 1351, and during the sixteenth century was a great port, being divided into special divs. for the Chinese, Jap., Malays, and Portuguese who traded there. It still remains a fairly important tn., the greater part of it being now built on the water. Chief amongst its remaining notable buildings is the Buddhist temple, 'the Golden Mount,' about 400 ft. high. Most of its great buildings are now in a state of ruin.

**Azaïs, Pierre Hyacinthe** (1766-1845), son of the musician of the same name, a Fr. philosopher, was b. at Sorèze. He entered a monastery, but soon renounced the monastic life. He was at first a warm partisan of the Revolution, but changed his views and was thereupon sentenced to deportation. He took refuge in the hospital of the Sisters of Charity at Tarbes, where he had leisure for his philosophical studies. After the fall of Napoleon, the Gov. granted him a pension of 6000 francs. He d. at Paris.



AZALEA

**Azalea** is a plant now included in the genus *Rhododendron* of the order Ericaceæ, which is a native of the mts. of Asia and N. America. *A. glauca* occurs in clayey swamps of America; *A. pontica* grows in the Crimea; *A. periclymenia*, the so called upright honeysuckle, is a native of N. Amer. woods; *A. indica* is a beautiful Chinese plant. The trailing *A.* is the sole species of the genus *Loiseleuria*, and is named *L.* (or *A.*) *procumbens*. The various kinds of *A.* are hardy and half-hardy shrubs of attractive appearance.

They do well in a mixture of loam peat and leaf-mould, to which has been added some sand. They may be increased by cuttings planted in a sandy soil in slight heat in spring. These shrubs grow to a height which varies between 10 and 15 ft.

**Azamgarh**, see AZIMGURH.

**Azan**, the call to prayer which is proclaimed by the muezzin from the mosque twice daily in Mohammedan communities. It consists of 7 or 8 phrases, most of them repeated, to each of which there is a set response to be used by the hearer. The muezzin proclaims the *A.* standing at the door or in the minaret of the mosque with his face towards Mecca and his ears stopped by his fingers, and during the proclamation passers in the street must stand still, all work must cease, and even the sick must sit up in bed.

**Azana, Manuel** (1851-1941), president of the Sp. Republic, b. at Alcalá de Henares. Entered the civil service and made a reputation as one of the leading Sp. men of letters. Towards the close of Primo de Rivera's (q.v.) dictatorship, A. came to the fore as a democratic leader, and, after de Rivera's fall, he was elected president of the Madrid Academy, member of the revolutionary committee which in 1931 signed the pact of San Sebastian, and in 1932 he became war minister to the provisional Republican Gov. Largely responsible for the grant of autonomy to Catalonia and for those articles of the Constitution which curtailed the freedom of the religious orders and legalised the suppression of the Jesuits. Succeeded Alcalá Zamora as head of the Gov. in 1931. Much criticised for the suppression of the risings of 1932, his Catalanism and his anti-Clericalism. When President Zamora was deposed by the Cortes in 1936 A. was elected in his place and left active politics. During the Civil war he was little more than a figure-head, and when the Nationalist forces were marching on Barcelona he went into exile in France. He d. at Montauban.

**Azandeh**, see Niam-Niam.

**Azara, Don Felix de** (1746-1811), a Sp. naturalist of the eighteenth century. Entered the Sp. Army and served for some considerable time in S. America, being appointed to 'the Council of Fortifications and Defence of the Two Indias.' His most famous book, pub. in 1809, was *Travels in South America from 1781 to 1801*.

**Azariah**, or **Uzziah**, king of Judah, 792-740 B.C., succeeding his father, Amaziah. The name is also given as that of sev. minor O.T. characters.

**Azay-le-Rideau**, tn. in W. France, dept. Indre-et-Loire, 16 m. S.W. of Tours. It has a fine Renaissance château. Pop. 2000.

**Azazel**, a name found in Lev. xvi. 8, 10, and 26, where it is trans. as scapegoat. Reference is made to 1 goat for Jehovah and 1 for A., and the antithesis is best conveyed by regarding the translation of A. as Satan, or an evil spirit. By many authorities, however, the word is regarded as being purely impersonal and simply conveying the idea of a 'going far away.' The word

was used by Milton as a name given to one of the of the followers of Satan, his standard-bearer.

**Azeglio**, Massimo Taparelli, Marchese d' (1798-1866), an It. author, painter, soldier, and statesman. He was b. at Turin. He was descended from a noble Piedmont family, and at the age of 15 he went to Rome with his father who had recently been appointed ambas. there, and became well known as a landscape artist. In 1830 he made the acquaintance of Alessandro Manzoni, the poet, whose daughter he subsequently married. The revolution in France in 1830 had given impetus to the liberal movement in Italy, and into this movement A. threw himself enthusiastically. He was, however, opposed to the doctrines of Mazzini, who was just beginning his career as an agitator, and advocating republican views. A., however, was imbued with the ideas of constitutional monarchy, and did his best to propagate his doctrines. In 1833 and in 1841 he pub. novels with a political tendency, *Ettore Fieramosca*, and *Niccolò di Lapi* respectively. He took part in the battle of Vicenza when the papal troops supported the rebels against Austria. After the defeat at Novara he was appointed president of the Cabinet by Victor Emmanuel, a position which he occupied until 1852, when he was succeeded by Cavour. At the close of the war of 1859 he was appointed commissioner of the Rom. states, a position which he carried out tactfully and successfully.

**Azerbaijan**, called variously Azerbijan and Aderbaizan; anciently called *Atropatene*. The name A. originates from that of Alexander the Great's satrap, *Atropathen*. In anc. Iranian *athro* means fire, for which there is also another name, *azar*. *Jan* or *djan* means 'province', and the name A. is a play on the word fire. There are 2 As., one a Soviet republic forming part of the U.S.S.R., and the other a prov. in N.W. Persia. The prov. is separated from the republic by the R. Aras (*Araxes*). The republic of A. is situated on the S.W. shore of the Caspian Sea, it extends from the Caucasus in the N. to Persia in the S., and from the Caspian in the E. to Armenia and Georgia. After the First World War, the Nationalist party of the constituent assembly of the Tatars of A., having in 1918 acquired the effective voice in affairs, declared the independence of A. on May 28, 1918. Two years later, however, the Bolshevik caucus in the pay of Moscow turned the Nationalist gov. out and voluntarily handed the cap., Baku, to Lenin's troops. The outcome of these events was a treaty between A. and the Russian Soviet republic. In 1922 the republic entered the Soviet Union as a member of the Transcaucasian Federation.

The Soviet republic's main source of wealth is in the oil-fields of Baku, the ann. average output of which is about 500 million poods. Other minerals such as naphtha, manganese, copper, and salt abound and production of them is increasing. The other prin. products are

grain and cotton; a little tobacco and silk are also produced as well as vine and garden produce. The pop., which is chiefly Moslem, is now about 3,210,000 (1939) (mainly Turko-Tatar), that of Baku being 710,000.

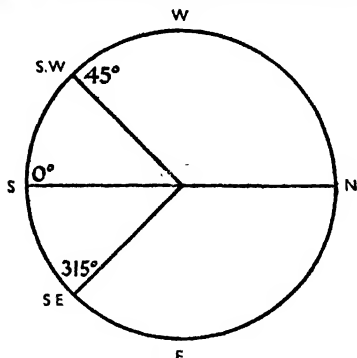
It is very mountainous, one of its mts., Salvan-Dagh, rises to the height of Mt. Ararat. It is very fertile in parts, and produces maize, barley, wheat, cotton, and tobacco.

After the war the continued presence of Russian troops in Persian A. in 1945 raised acutely among the Allies the question of Persian sovereignty in that prov. The original occupation was justified on grounds of expediency. For, Persia lying athwart the single route along which supplies could be sent into the Soviet Union as an alternative to the difficult Murmansk route, Brit. and Russian forces entered the country, supported by Amer. technicians, to improve and use the communications. But by the Anglo-Russian-Iranian treaty of Jan. 1942 the 2 powers restated their respect for the political independence and territorial integrity of the Iranian State (or Persia), and both countries agreed to withdraw within 6 months of the end of the war. Soon after the occupation began the Russians launched an Iranian Democratic party and endeavoured to win over local party groups by promises of extended social services. The Azerbaijanian people were assured that there was no separatist tendency implied by this move, but the other Allies saw in it a policy designed to separate Iranian A. and join it to the A. S.S.R. on the hypothesis of a common language and other interests in common. But though there is, in fact, a common spoken language that in Russia is written in Cyrillic (Russian) characters while that of Persian A. is not written at all save in Iranian script. Moreover, there is a fundamental difference of religion: those who live in Iranian A. are Muslims of the Shi'ite persuasion, and those of the U.S.S.R. of the Sunni. To the orientalist the deduction that Iranian A. ought therefore to be united with the A. S.S.R. did not follow, and in any case, even if union were desirable, it should be the other way round. The name A. was only given to the ter. of the present S.S.R. of that name under the rule of the late Enver Pasha, whose aim was to sow the seeds of a future Irredentism within Russian Trans-Caucasia which might lead those parts to eventual union with Turkey. The Brit. forces began to evacuate the country before the end of 1945, but, as the Russians showed no signs of reducing their forces there, the other Allies proposed that the question should be referred to the United Nations (q.v.). Subsequently it appeared that the Soviet Union and Persia had arrived at an agreement and it was reported that the Russian troops were clear of Iranian A. by May 6 (1946); but, later, the Persian representative informed the United Nations Organisation security council in New York that the Persian

Gov., owing to the existence of a hostile army created under the auspices of the Russian forces, was unable to discover the real situation in A. Subsequent investigations, however, enabled the Persian Prime Minister to announce that the evacuation of Persian soil by Soviet troops had been completed by May 9.

**Azides**, salts of azoimide or hydrozoic acid. Azoimide (formula  $N_2H$ ) has similar properties to those of hydrochloric acid.

**Azimghurh**, **Azimghur**, or **Azamgarh**, a tn. and dist. of India in the United Provs. of Agra and Oudh. The tn. is situated on the R. Tons, a trib. of the Ganges, N.E. of Benares, 475 m. from Calcutta. Produces sugar, rice, indigo, and opium. Inhab. Hindus and Muslims. Pop. of dist. about 1,600,000; tn. about 20,000.



**Azimuth**. The A. of a celestial object is that point in the arc of a horizontal circle intersected by a vertical circle passing through the centre of that heavenly body. Thus, if a star is due S. it is said to be of A.  $0^\circ$ , but if it is S.W. it is  $45^\circ$  A., or S.E.  $345^\circ$  A. Taken in conjunction with its altitude (q.v.), the A. of a star as ascertained by the altazimuth (q.v.) fixes its position on the celestial concave.

**Azineourt**, see AGINCOURT.

**Azo**, see Azzo.

**Azo-Compounds**, organic substances containing the group  $R_1-N=N-R_2$ ,  $R_1$  being an aryl radical and  $R_2$  either an aryl radical or a substituted alkyl. Many A.-C. are important dyes, such as chrysoidine, Congo-red, and methyl-orange, and other members of the group are azo-benzene, the amino-A.-C., the oxyazo-compounds, the diazoamines, diazoaminobenzene, the azoxy-compounds, etc.

**Azogues**, quicksilver.

**Azougues**, or **Canar**, a prov. of Ecuador. Area, 1520 sq. m. Pop. 112,000.

**Azole** (Gk.  $\alpha$ , without,  $\omega$ , life), a geological term applied to such rocks as are found to contain no fossils. The constant tendency, however, is for geologists to discover traces of fossils in rocks hitherto considered A. Archaean crystalline schists are held by some to form the A. system.

**Azore**, a stuff like beaver cloth, manufactured in Styria, Austria.

**Azores**, a group of is. in the Atlantic belonging to the Portuguese. They are called also the W. Is., and are situated between lat.  $36^\circ 55'$  and  $39^\circ 55'$  N. and long.  $25^\circ$  and  $31^\circ 18'$  W. They were discovered and colonised by the Portuguese between the years 1430 and 1480, but they had been known to W. Europe previously, since they are recorded on some of the earlier medieval maps. On the is. of Corvo, in the A. group, Punic coins have been discovered, which show that the Carthaginians must at some earlier period have visited them. When the Portuguese rediscovered them in the fifteenth century they were uninhabited, and their present pop. is chiefly of European descent. They were presented by Alfonso V. to his aunt, Isabella of Burgundy, under whose rule a great immigration of Flemings took place. The A. consist of 9 is., which fall into 3 groups; the central group is composed of the is. of Terceira, São Jorge, Pico, Fayal, and Graciosa; the N.-westerly group of Flores and Corvo; the S.-easterly group of São Miguel and Santa Maria. The is. are of volcanic origin, and present a very picturesque though somewhat rugged appearance. A number of them still suffer from periodical volcanic eruptions, and the surface of the is. consists to a very great extent of lavas and basalts. The highest peak in the is. is Pico Alto, which reaches the height of 7613 ft. São Miguel is the largest of the is., and is also the most populous and the richest; it has an area of 299 sq. m. Ponta Delgada, situated in this is., is the largest port of the whole group. The cap. of the A. is Angra in the is. of Terceira, which tn. is also a port. Horta, in the is. of Fayal, is also a port; but unfortunately there are no good harbours. Sugar-cane, coffee, and tobacco are grown and tropical fruits of all kinds, including bananas and olives. The chief exports of the is. are oranges, wine, brandy, lemons, and corn, most of which are exported to Great Britain or Germany. They export also pork, salt beef, and coarse linen. The climate is mild and healthy, and the A. are rapidly becoming a winter resort; the average temp. is about  $60^\circ$ . Most of the flora of the is. is European, only about 40 plants out of a known 500 species being indigenous. The name A. was given by the Portuguese to the is. because of the numbers of hawks found there (Portuguese *apar*, hawk). On Aug. 31, 1926, the city of Horta was much damaged by an earthquake. At the height of the battle of the Atlantic (q.v.) in 1943 the Portuguese Gov., at the request of Britain, agreed to grant temporary facilities in the shape of naval and air bases in the A. and other Portuguese is., which would enable better protection to be given to merchant shipping in the Atlantic against Ger. submarines or other hostile craft. The agreement included provision for Brit. assistance in furnishing essential material and supplies to the Portuguese armed forces.

These arrangements owed their validity to the treaty between Britain and Portugal made in 1373 and reinforced by 7 later treaties between 1386 and 1815, to a secret declaration of 1899, and, in more modern times, to treaties of arbitration made with Portugal in 1904 and 1914 which recognised the validity of all the antecedent treaties. Thus was vindicated an engagement which had lasted for nearly 6 centuries, and which was without parallel in world hist. Area of the group, 920 sq. m. Pop. 254,000.

See W. F. Walker, *The Azores*, 1886; J. Mees, *Histoire de la découverte des îles Azores* (Ghent), 1901; A. S. Brown, *Madeira, Canary Islands and Azores*, 1922.

**Azote** (Gk. α-, without, ζωή, life), the name given at one time almost universally to nitrogen, from the fact that uncombined with oxygen it is unable to support animal life.

**Azotised Bodies** are substances which contain nitrogen and form part of the structure of plants and animals; such are albumen, casein, gelatine, etc.

**Azotus**, see AZHDON.

**Azov**, a Russian tn. on the S. bank of the Don, about 20 m. from the mouth of that riv., it is also about 25 m. E. of the tn. of Taganrog, its trade rival. It is a great fishing centre, and to a certain extent the outlet for the produce of S.E. Russia. It is identified with the anct. tn. of Tanais, near which site A. was built, and the medieval tn. of Tana. Captured first by the Russians in the tenth century, it did not become a part of Russia until 1774, although it had previously been captured by Peter the Great from the Turks (1696). It was bombarded by the allied army during the Crimean war. Taken by the Gers. in 1941; retaken Feb. 7, 1943. Pop. 17,500.

**Azov, Sea of**, a N. arm of the Black Sea with which it is connected by the strait of Yenikale, or Kertch, about 28 m. long and very narrow, not exceeding 4 m. in breadth at its widest part. The anct. name of this strait is Bosphorus Cimmerius. To the W. of the S. of A., and separated from it only by a long narrow sandy peninsula called Arabat, is the Sivash, or Putrid Sea, a series of lagoons and marshes. To the Romans the S. of A. was known as the Palus Mæotis, the name being given to it from the people who dwelt on its banks, and who, in their own tongue, called it the Mother of Waters. By the Turks it is known as the Baluk Deniz, or Fish Sea, owing to the number of fish which are found there. There is supposed to have been prehistorically a connection between the Caspian Sea and the S. of A. It lies between lat. 45° 20' and 47° 18' N., and long. 35°-39° E. Its greatest length is a little over 220 m., and its average breadth is about 80 m.; its total area just exceeding 14,000 sq. m. It is remarkably fresh, although this freshness differs in various parts of the sea owing to the various currents. It is frozen across in mid-winter. The depth varies

from 3 ft. in some places to 50 ft. Its greatest trib. is the R. Don, and in fact the deepest part of the lake forms a continuation of the Don basin. Winter wheat, winter rye, and sunflower are the main crops of the surrounding ter. It has a number of important tns. on its banks, but its lack of commodious harbours prevents it from obtaining all the trade which it might have. Amongst important tns. on the S. of A. may be mentioned Taganrog, Berdiansk, Mariopol, Yenikale, and Kertch, all of which figured in the Russo-Ger. campaigns of 1943 (see EASTERN FRONT or RUSSO-GERMAN CAMPAIGNS IN SECOND WORLD WAR.)

**Azpetitia**, a Sp. tn. in the prov. of Guipuzcoa. About 16 m. S.W. of San Sebastian. Just outside this tn. was b. in 1491 the founder of the Society of Jesus, Ignatius Loyola. The house is still preserved within the walls of the Loyola convent. Pop. 2800.

**Azrael**, also called Raphael, and identified with Gabriel, Michael, and Uriel as the 4 archangels 'who go in and out before the glory of the Holy One.' In Moslem mythology he is the angel of Death, regarded in a very similar manner to Fate. Jewish tradition has made him almost an evil genius.

**Azrek**, see BAHR-EL-AZREK.

**Aztecs**, The, are the best known of the numerous tribes which inhabited Mexico. Their early hist. has been elucidated by Humboldt, and the story of their wanderings is told in their picture-writing. They appear to have been of the same origin as certain Asiatic tribes; according to their hist., they came from a pleasant land, Aztlan, somewhere to the N.E., leaving it probably about the seventh century A.D. They wandered towards the S.E., led by their priests, leaving settlements which are distinguishable now. Finally, about 1200, they settled at Chapultepec, at the foot of the volcano Popocatepetl. However, their savage customs were resented by the tribe of the Chichimecs, and they were driven to the lagoons, but a hundred years afterwards they gained their liberty. Led by their priests, they chose a site for and built their cap., Tenochtitlan, also called Mexico, from the name of their god Mexitli. From this god also the A. were called Mexicans, which name was afterwards applied generally to all the inhab. of the country. In this place they built up a magnificent civilisation, and by means of alliances and wars extended their empire over the greater part of what is now modern Mexico. Their later emperors, the Montezumas, were said to possess such wonderful treasures that they have been considered types of magnificence, though it is probable that the greater part of this is due to tradition. Their religion included the sacrifice of human beings taken from prisoners of war. They were an agric. people, had an elaborate system of irrigation, and studied astronomy. According to their belief, time was divided into cycles of 52 years, the close of each cycle being supposed to portend

some grave national disaster. During the last 5 days of each period, they observed various religious ceremonies, intended to avert this catastrophe; immediately afterwards they gave themselves up to rejoicing. The last time that this ceremony of 'tying up the years' was observed was in 1506. The last of the Montezumas succeeded in 1502. The A. were now at their greatest height, but they were feared and hated by all the surrounding nations, and this king, by carrying out a policy of wanton aggression and by the use of human sacrifices, increased this enmity. Rumours of the

as a sun-dial and calendar, such as the Egyptians and Chaldeans used. The inscribed procession of cyclical animals has given rise to the belief that the chronological system which produced the stone had some connection with the Tatar zodiac, and even with the Chinese and Indian astronomical system. Its age is about A.D. 1479, but it is said to have been a copy of some anterior stone evolved through the ages. Also in the museum is a sacrificial stone, 9 ft. in diameter, sculptured from trachyte and upon which human victims in the terrible sacrifices of the A. were butchered, their breasts cut open with obsidian knives and the still-beating heart torn out and flung before the statue of the war-gods in the temple on the *teocalli*.

Consult W. H. Prescott, *History of the Conquest of Mexico*, 1843; also E. J. Payne, *History of the New World*, 1892; T. S. Joyce, *Mexican Archaeology*, 1922; J. E. Thompson, *Mexico before Cortes*, 1933; H. P. Parkes, *A History of Mexico*, 1939.

**Azuza**, a prov. and tn. in the Dominican republic. Petroleum is found in the vicinity.

**Azuaga**, a tn. of Badajoz, Spain, 20 m. E. of Llerena in the centre of the silver and lead mining dist. It has valuable Rom. remains. Pop. 17,500.

**Azuay**, a S. prov. of Ecuador lying to the N. of Loja, and extending to the R. Amazon. It takes its name from the mt. knot lying to the W. called A. It is fertile and well watered. The cap. tn. is Cuenca. Area about 4000 sq. m.; pop. 237,000.

**Azul**, the name of a tn. and dist. in the prov. of Buenos Aires in the Argentine republic. The tn. is the centre of a colony of Its. and Basques. The dist. has a pop. of about 51,000, the tn. 38,000.

**Azulejos**, the name given to a peculiar blue tile which was made by the Mohammedans of Persia, Egypt, and Spain. The manuf. was learnt by the Spaniards from the Moors, and kept up after the conquest of Granada had driven the Moors from Spain. So skilful did the Spaniards become in the manuf. of these tiles that it is not easy to distinguish the Sp.-made from the Moorish-made tile.

**Azun**, sometimes called the 'Eden of the Pyrenees,' in the S.W. of dept. Hautes-Pyrénées. Watered by a trib. of the Gave de Pau.

**Azuni**, Domenico Alberto (1749-1827), a distinguished writer on international law, and jurist. He was b. at Sassari in Sardinia. He studied law at Sassari and Turin, and at the age of 32 was made a judge of the consulate at Nice. He pub. his general dictionary of mercantile jurisprudence in 1788, and in 1795 a book on the growth and progress of maritime law in Europe. He was appointed by Napoleon to be one of the commissioners engaged in drawing up a new commercial code, and in 1807 he became president of the Court of Appeal at Geneva. After the fall of Napoleon he went into retirement until he was recalled and made a judge at Cagliari by Victor Emmanuel I.



Mexican Embassy

#### SCULPTURE OF THE AZTEC TEMPLE OF QUITZALCOATL

approach of the Spaniards had already reached Mexico. In 1517, emissaries of Velázquez, governor of Cuba, penetrated far enough to see some of the glories. Hence, in 1519, Hernando Cortés began his famous expedition, which ended in the conquest of Mexico. He destroyed the greater part of the ships of Montezuma and advanced inland. Montezuma sent him gifts, and ordered him to return. Cortés replied insolently, and then proceeded to take advantage of the isolation of the A. He conquered and christianised Tlaxcala, a small republic at enmity with Montezuma, and then advanced. Montezuma was forced to submit, and d. in 1530. Cortés was driven back for a time, but returned and besieged the cap., Mexico, for 80 days. With its fall comes the end of the native hist. of Mexico.

In the national museum of Mexico city is the famous Calendar stone of the A., or sun-stone, a beautiful and massive monolith of carved basalt, circular in form and 12 ft. in diameter, which was used both

**Azure**, the word used technically to denote blue in heraldry. This term is always used in describing the escutcheons of those beneath the rank of a baron. It is represented by horizontal lines in engraving arms.

**Azurine**, or **Blue Roach**, a variety of the rudd, or red-eye, distinguished by its slate-blue back, silvery-white abdomen, white fins, and straw-coloured iris to the eye. It belongs to the Cyprinidæ or Carp family. It is found all over the Continent, and has been introduced into England, not with very great success, although it is sometimes found in Lancashire. The fish is small and hardy, affords good sport, and has firm, well-flavoured flesh.

**Azurite**, a name given to the stone which is also known as lazulite. This stone, together with lapis lazuli, and mineral turquoise, is given the generic

name of azure spar. It is a brittle, transparent mineral, with monoclinic crystals. It occurs in England in Derbyshire, Devonshire, and Cornwall, and in many parts of the Continent, such as France and Austria.

**Azym**, **Azyme** (Gk. ἄζυμος, not, ζύμη, leaven) unleavened bread eaten by the Jews at the Passover.

**Azymites**, the name given by the orthodox Gk. Church to the adherents of the W. Church who used unleavened bread in the observance of the Lord's Supper. The patriarch of Constantinople attacked the W. Church on this point during the eleventh century.

**Azzo**, sometimes called **Azo** and **Azzolenus**. A prof. of civil law in the univ. of Bologna during the thirteenth century. He has left us his *Readings on the Code*, which is considered by Savigny to be the most important contribution of his school.



## B

**B** is the second letter of nearly all the anct. and modern alphabets. It is the exact counterpart of the Semitic *beth* (including N. Semitic and Heb.), the Arabic *bē*, and the Gk. *bēta*. The sound the letter represents is the sonant labial mute or lip-voice stop consonant, i.e. the sound produced by closing the lips and vibrating the vocal chords. In some languages, however, *b* tends to exchange value with *p*, *v*, *f*, or *m*. So, for instance, in the fourth century A.D., *b* in Gk. came to assume the phonetic value of *v*, and hence in the Cyrillic alphabet and its descendants (Russian, Bulgarian, and so forth) the letter *b* has the phonetic value of *v*, but out of it a new letter was created to express the phonetic value of *b*. The symbol *b* passed through various forms. The capital *B* roughly corresponds with the anct. Rom. and Gk. classical *B*; the minuscule *b* is derived from the same form by eliminating a pair of the letter (the upper loop), while the cursive form *ℳ* evolved from *B* by imperfect junctions of the loops. In the Aramaic alphabet, the opening of the top of the letter *beth* was a prominent feature, and in its descendant, the square Heb. alphabet (the prototype of modern Heb.), the upper loop completely disappeared. The evolution of the form of the Arabic *bē* (as of all the Arabic letters) was the most rapid amongst all the branches of alphabetic scripts. The numerical value of *b* is 2 in most alphabetic scripts.

**B**, in music. In Eng. music *B* represents the seventh degree of the diatonic scale of *C*, but in Ger. music *H* represents the Eng. *B*, while *B* represents the Eng. *B* flat. The musical signs denoting flat and natural are modifications of the letter *b*, i.e. the sign *b*, denoting flat, is a *b* with a slightly pointed loop, and the sign *n*, denoting a natural, is a *b* with a square loop. These signs are used because *B* was the first note of the scale to be modified by a semitone.

**Baader**, Benedict Franz Xavier (1765-1841), a Ger. Rom. Catholic speculative theologian and philosopher, *b.* at Munich, studied medicine at Ingolstadt and Vienna, graduating in 1784. During his stay in England (1791-96) he became acquainted with the work of Hume, Boehme, Eckhart, and Saint Martin. He became an engineer by profession, and was superintendent of the Bavarian mines (1817-20). He was appointed prof. of philosophy and theology at Munich (1826). The rationalism of Hume repelled as much as the mysticism of Boehme attracted him. His philosophy is based on the doctrine of the Catholic Church and is religious rather than ethical. His writings are metaphysical and obscure in tone, but he is considered

by many to be the greatest Rom. Catholic thinker of modern times. His opposition to the interference of the Rom. Catholic Church led to an interdict forbidding all laymen from lecturing on the philosophy of religion (1838). His collected works were pub. at Leipzig (1851-60) in 16 vols., vol. xv. containing his life by F. Hoffmann. A selected ed., ed. by Claassen, was issued in 2 vols. (1886-87).

**Baal**, the chief male deity of the Phœnician and Canaanitish nations. Worship of *B*. began as a god of the sun, but later he was regarded as having a certain sway over morals. The first peoples to worship him adopted a form of nature worship on mt. tops. Those mts. included Horeb and Sinai, where the Midianites and Amalekites congregated respectively; Mt. Peor, used by the Moabites; Carmel, chiefly used by the Phœnicians; and Hermon, where the Canaanites of the interior met. *B*. stood for the life-giving power of the sun, while Moloch represented the sun's destructive influence. Later both were united under the name Melkart, who became the supreme Phœnician deity. The word *B*. is found in many names of persons and places in Heb., Chaldee, and Phœnician, e.g. Jezebel, Hasdrubal, Hannibal, Baalbek. *B*. is not to be confounded with *Beal*, a Celtic deity.

**Baalbek**, an anct. city of Syria. The ruins stand 35 m. N.N.W. of Damascus and 38 m. S.S.E. of Tripoli. The name means *Baal's City*. During its occupation by the Gks. its name was changed to Heliopolis. It lies at the opening of a small valley in the plain of Coele-Syria (El Bukā'a), a dist. of pleasing appearance, and occupies a position 4500 ft. above sea level. Of all Syrian cities *B*. was foremost for the beauty of its buildings and the splendour of its streets. It is remarkable now for the magnificent ruins of Rom. temples it possesses, among which one specially noteworthy is the Great Temple, the finest building in the city. The columns of the entrance measure 88 ft. in height and 22 ft. in circumference. Originally there were 54 columns, of which 6 are now standing, while the ground is strewn with the ruins of the remainder of the structure. A smaller temple stands to the S. of this, and is larger than the Parthenon at Athens. Both are built of limestone. The actual hist. of *B*. is in its beginning difficult to trace. Without doubt it was used, as its name indicates, as a temple of *Baal*. Under Julius Cæsar it was made a Rom. colony. In the second century it was renowned for an oracle, and Trajan is said to have been sufficiently impressed with its powers to consult it before embarking upon his second Parthian war. The Great Temple was built by Antoninus Pius (A.D. 138-

161), though the inhab. to-day attribute its erection to Solomon. Theodosius the Great converted it into a Christian church on the establishment of that religion. During the wars which followed, it was used as a fortress by the Arabs, traces of which are yet visible. In 1400 the city was completely sacked by Timūr Beg. Near by is the largest cut stone in the world—60 ft. by 17 ft. by 14 ft.—weighing 1500 tons. To-day the inhab. live in a state as wretched as the anc. city was once opulent, and its pop. is only about 5000.

**Baan, Jan van** (1633–1702), a Dutch portrait painter, b. at Haarlem. By invitation of Charles II. he came to England and painted portraits of the king and queen and many of the nobility. On his return to The Hague, he executed a portrait of the duke of Tell, which brought him 1000 Hungarian ducats. He also worked for the duke of Tuscany, who placed a portrait of the artist in the gallery at Florence; and Louis XIV. consulted him frequently on the purchase of pictures. B.'s best piece of work is, probably, the portrait of Prince Maurice of Nassau. He d. at Amsterdam.

**Baanfu** (also **Batang** or **Patang**), cap. of the prov. of Sikang, China. At B. the bed of the Yangtse R. is nearly 10,000 ft. above sea level.

**Baasha**, an Issacharite who slew Nadab, son of Jeroboam I., at the Philistine tn. Gibbethon, afterwards killing all the rest of Jeroboam's family. B. thereupon became king of Israel (c. 914 B.C.), and prosecuted an energetic policy against Asa, king of Judah. By bullding Rama, he hoped to cut off Jerusalem from the outer world, but Asa procured the help of Syria. B. was buried at Tirzah, the royal residence. See 1 Kings xv. 27 to xvi. 7.

**Baba**: 1. A corruption of *papa*, father, applied as a title of distinction in Persia and Turkey to dignitaries, especially of the ascetic life. 2. B. (the old woman), the name of a favourite character in Slavonic mythology, represented as an old witch or hag with a hooked nose, prominent teeth, and grey dishevelled hair.

**Baba** (A. c. 1240), a Turkish impostor, or prophet, who devastated Asia Minor and was killed by the combined forces of the Turks and Christians.

**Baba, Cape**, a frowning prominence near the W. point of Anatolia. The Gks. called the cape Lectum, and it was important in classical times as separating Troas from Æolia. On the promontory stands the tn. of B., which has a pop. of about 4000.

**Babahan**, or **Behbehan**, a Persian tn., 130 m. N.W. of Shiraz in the prov. of Khuzistan. Ruins of Arrajan are in the vicinity. Pop. 2000.

**Babahoyo**, or **Bodegas**, cap. of prov. Los Rios, Ecuador, S. America, on the R. Guayas. It is about 45 m. N.E. of Guayaquil, and is the busy trading centre for this city and Quito; pop. 20,000.

**Babar**, see **BABER**.

**Babadagh**, or **Babadagh**, a tn. situated in Rumania, cap. of the Dobrudja; has

a considerable Black Sea trade; pop. 5000.

**Babbage, Charles** (1791–1871), Eng. mathematician, b. at Totnes, Devonshire, and promoter of an important Eng. mathematical revival. He observed that mathematical calculations were greatly impeded by the use of imperfect logarithm tables, and he devoted his attention to the construction of a correct table of logarithms (pub. 1827). The ruling passion of his life, however, was the idea of construction of a great calculating machine. The Gov. contributed £17,000 in aid of its construction, and B. himself expended £6000, but the machine was never completed, owing to disagreements between the constructor and the Gov. The imperfect machine is now preserved in the S. Kensington Museum.

**Babbacombe**, a vil. in Devonshire, 2 m. N. of Torquay. It is a favourite resort of summer visitors. Gained much notoriety from the fact that the criminal Lee, who committed a murder at B., was thrice placed on the scaffold, the trap-door of which refused to work. Lee's execution was postponed, and subsequently commuted to penal servitude. Near by is Kent's Cavern, in which were found remains of prehistoric man. Pop. 3100.

**Babbitt's Metal**, an alloy of copper, antimony, and tin named after its inventor, Isaac Babbitt (1799–1862). It is an anti-friction metal used for shaft bearings.

**Babel, Tower of**, according to the legend of the book of Genesis (xi.), a tower built by the inhab. of B., with the intention of scaling heaven. The Almighty in the narrative miraculously intervenes, and the builders are punished for their presumption by having their speech confounded. The legend thus endeavours to account for the diversity of speech among the different nations of the world, and probably arose from a misunderstanding of the etymology of the word B. B. (Assyrian *Bab-il*) is the native name for what appears as Babylon in the Gk., and signifies Gate of God. It has no connection with the Heb. word *bālal*, signifying to confound. The student of comparative mythology will readily see an analogy between this legend and the Gk. myth of the Titans who attempted to scale heaven by piling Pelion on Ossa. Various sites of the tower have been suggested, e.g. Birs Nimrud near Babylon and Amran within the city. Later interpretation contends that the words 'its top shall be in the heavens' means no more than 'very high' and that the purpose of the tower was to serve as a rallying point for the inhab. of the plain in the land of Shinar. (Consult T. G. Pinches, *The Old Testament in the Light of the Records of Assyria and Babylonia*, 1902, and the *Internal Standard Bible Encyclopedia*.) The remains of 'the temple of the foundation of heaven and earth' called by Nebuchadnezzar the Ziggurat Babil, or Tower of Babylon, towered high above the surrounding plain. The burnt bricks of which it was composed

were all, it is said, cleared out in order to use them for the repair of the Hindiyeh canal. We cannot, however, be certain that this Tower of B. included or stood on the site of the *migdol* or watch-tower in question, although it was built of similar materials.

**Bab-el-Mandeb**, or The Gate of Tears, from its dangerous currents, is a strait separating Arabia and Africa. The Red Sea is joined to the gulf of Aden by it. On the E. side it is called the little, and on the W. the great strait.

**Babelthuap**, the chief is. in the Pelew group, or W. Carolines, in the Pacific Ocean, being about 30 m. in length. It has a fertile soil, and is subject to volcanic eruptions. It was administered by the Jap. under mandate before the Second World War. Pop. (of the group) 6300.

**Babenberg**, the name of a princely Ger. family which came from Franconia, near Bamberg, and flourished from c. 980 to c. 1246. The most noteworthy member of the family was Leopold I., surnamed the illustrious, who became margrave of Austria, 960.

**Baber (Fehir-ed-din Mohammed)** 1483-1530, the first great mogul of India. He was a descendant of Timur. At 12 he succeeded Omar Sheikh Mirza to the rule of the dominions lying between Samarkand and the Indus. Strife ensued owing to the usurpation of an uncle and the revolt of some of the nobles. With surprising courage and determination, however, the young ruler seized and held the provs. of Kashgar, Kunduz, Kandahar, and Kabul. Delhi and Agra speedily fell before the impetuosity of his attack. But his reign as mogul was short, for he d. after having reigned 5 years. Not only were his talents remarkable in civil and military gov., but he possessed also a passion and genius for science and art, and to his many achievements of administration in the improvement of roads, the measuring of land, the levying of taxation, and postal organisation is to be added a hist. of his life and conquests written in the Tatar language. The eldest of his 4 sons succeeded him to the throne at Delhi.

**Baber**, or **Babber Islands**, in the Dutch E. Indies, belonging to the residency of Amboyna. See **SUNDA ISLANDS**. LEESER.

**Baber**, **Edward Colborne** (1843-90), Eng. author and traveller. He was b. at Dulwich, educated at Christ's Hospital, and graduated from Magdalene College, Cambridge, in 1867. He went out to Peking as a student interpreter, and became a first-class assistant in 1872. In 1879 he became Chinese secretary of the legation at Peking. He made 3 journeys into the interior of China, in 1876, 1877, and 1878, which he described in *Travels and Researches in Western China*, 1886; *Chinese Tea Trade with Tibet*, 1886, which appeared in the Royal Geographical Society's *Supplementary Papers*, was awarded the medal of the society. He was consul-general in Korea (1885-86) and political resident

at Bhamo on the Upper Irrawadi from 1886 till his death. See the *Proceedings of Royal Geographical Society*, 1883, 1886, and 1890.

**Babeuf**, **François Noël** (1760-97), a Communist and journalist of the Fr. Revolution. He adopted the title of Gracchus B. as editor of a paper called the *L. Tribun du peuple*, uncompromisingly communistic in principle. He was guillotined for an attempt to overthrow the Directory and establish Communism.

**Babi Islands**, or **Baby Pulo**, form a group of the Malay Archipelago.

**Bablu**, see **BABYLONIA**.

**Babington**, **Anthony** (1561-86), Eng. Catholic conspirator, son of Henry B. and Mary, daughter of Lord Darcy. He acted as a page to Mary Queen of Scots when a prisoner at Sheffield, to whom he soon became strongly attached. In 1580 he became an attendant at the court of Queen Elizabeth, and in 1586 one of the chief promoters of a far-reaching conspiracy. The plot had for its object the assassination of Elizabeth, the liberation of Mary, and the reorganisation of the constitution in Catholic interests. B., in order to have lasting testimony of his own importance in the conspiracy, entered into correspondence with Queen Mary regarding the progress of the plot. The letters were discovered and the conspiracy was betrayed. B. tried to escape, but was arrested, tried, and condemned to death. He wrote a letter to Queen Elizabeth begging redress, but to no avail. The discovery of this plot was the chief cause of Mary's own execution.

**Babington**, **Churchill** (1821-89), classical scholar, scientist, and archaeologist, b. at Roeliffe, Leicestershire. He held the Disney professorship of archaeology at Cambridge, 1865-80, and lectured chiefly on Gk. and Rom. pottery and numismatics, illustrating these lectures from his own valuable collection of coins and vases. He was, moreover, an authority on botany, ornithology, and conchology. He catalogued the classical MSS. in the univ. library and the Gk. and Eng. coins in the Fitzwilliam Museum. His fame as a classical scholar is based on his ed. of Hyperides' speeches (*Against Demosthenes*), 1850; *On behalf of Lysiphron* and *Euxenippus*, 1853; and *Funeral Oration*, 1858, from the papyrus discovered at Thebes in 1847. His other works include *Roman Antiquities found at Rouham*, 1872, and an ed. of Higden's *Polychronicon*, 1858.

**Babington**, **Francis**, Eng. divine. Graduated at Cambridge; went to Oxford, 1555. By this date he had changed his religion, his name being appended to the Rom. Catholic articles of belief. When Elizabeth came to the throne the Rom. Catholic master of Balliol was removed and B. appointed, for with him conscience never stood in the way of preferment. Leicester chose him to preach Amy Robsart's funeral sermon at St. Mary's in 1560, but later he appears to have lost his patron's favour. He was suspected of being a secret papist, was obliged to resign from the rectorship of Lincoln College, 1563, and in 1565 fled

to the Continent, where he d. about 1569.

**Babington, Gervase** (1550-1610) successively bishop of Llandaff, Exeter, and Worcester; fellow of Trinity College, Cambridge; incorporated M.A. of the Oxford Univ., 1578. He became tutor to the Pembroke family, where he made a friend of Sidney's sister. Through the patronage of this influential family he obtained many Church preferments. In 1599, Queen Elizabeth was said to have called him to account for a sermon preached before her in which he made hints on behalf of the earl of Essex, her quondam favourite. He wrote many little treatises which are very dear to the heart of collectors of Elizabethan quartos. They include his *Very Fruitful Exposition of the Commandments by way of Questions and Answers*, 1590 and 1600; and *Comfortable Notes upon the Bookes of Exodus and Leviticus*, 1604. A folio ed. of his works was ed. by Miles Smith, 1637.

**Babinski's Sign**, a medical term which indicates a curious physical phenomenon pointing to disease of the nervous system. If the sole of the foot of a person in normal health be tickled the toes bend inwards, but if there is organic disease of the lateral columns of the spinal cord the toes will bend upwards; the former is known as *flexor response*, the latter *extensor response*, or **Babinski's sign**.

**Babirusa, Babiroussa, or Babyroussa**, an interesting animal of the pig genus, and found only in the E. Indies, in Celebes and Buru. The B. is much more agile than the ordinary pig, having a less cumbersome body and longer and thinner legs. The peculiarity of this species lies in the fact that the upper canine teeth of the male are persistent, like those of rodents, and pierce through the skin of the snout and curve back over the forehead. The teeth have even been known to penetrate the skull. The teeth thus correspond to the tusks and horns characteristic of the male sex of so many animals. This abnormal condition of the teeth undoubtedly originated from adaptation to a particular environment, though the exact reason of the phenomenon is not apparent. The teeth probably served as a means to facilitate the capture of the females.

**Babirush**, see **BABYLONIA**.

**Baboon, or Cynocephalus**, meaning 'dog-headed,' a genus of monkey. Numerous branches of the family include the mandrill, drill, sphinx, chacma, and hamadryas. Africa was their original home, though they have spread into the nearer portions of Asia. The most characteristic features of the animal are, prominent snout, large canine teeth, cheek pouches, strange ugly cushions on which it sits, and shortness of tail. It was sacred in Egypt, and figures frequently upon Egyptian tablet inscriptions and statues. They usually live in herds and form dangerous opponents. They are intelligent animals and possess well-developed brains; besides extraordinary ferocity of temper.

**Babou, Jean, baron of Saggone**, a Fr. soldier, grand master of artillery, 1529. He commanded the artillery at the battle of Saint Denis, 1567, and took part in the battle of Jarnac in 1569, and d. in the same year.



BABOON

**Babrius**, a Gk. collector and versifier of fables. The period of his existence is probably in the time of Augustus. Some say that he was by birth an It. and that he lived at the court of Alexander Severus (A.D. 222-35). He collected many of Aesop's fables and turned them into choliambic verse. The first traces in so-called Aesopian fables of B.'s versification were discovered by Bentley. It was not until 1842 that a definite conclusion could be drawn, and then Minoldes Minas, a Gk. in the service of the Fr. Gov., while exploring the convents of the E., unearthed at Mt. Athos a MS. containing no less than 122 then unknown fables of B. (A second MS. containing 21 more fables was found in the Vatican.) He made a copy of them, and in 1844 they were pub. Later, in 1857, he produced 95 more, though their authenticity has been disproved by eminent scholars, among whom are Conington and Cobet. The best ed. is Rutherford's, 1883.

**Babu, or Baboo**, originally an Indian term of address applied to a proper name and corresponding to the Eng. 'Mr.' The word has come to signify a native with a smattering of Eng. culture, and is used as a term of disrespect. B.-Eng. consists of polysyllabic words for the most part misapplied.

**Babul Tree**, the *Acacia arabica*, also known as the gum-arabic tree, is a native of the E. Indies, Arabia, and Abyssinia. It is a tall tree and yields large quantities of gum-arabic, which is produced by wounding the bark and allowing the fluid to run out.

**Babuyanes**, a Malay word meaning pig islands. They are a group of is. to the N. of Luzon, one of the Philippine Is. The most prominent isles are Babuyan, Calayan, and Camiguen. They are of a mountainous character.

**Baby, see BIRTH, CONCEALMENT OF; CHILD.**

**Babylon**, anct. cap. of Babylonia, first mentioned in a tablet of 3800 B.C. From 2250 B.C. it became the cap. of Babylonia and the holy city of W. Asia. B. is the Gk. form of Babel, meaning the gate of the God. Under Nebuchadnezzar it became one of the wonders of the anct. world. Herodotus has a description of the city, and from the style of it one would imagine that he speaks as an eye-witness. It was in the form of a square with 120 stadia given as the length of one side. This would

ceeding siege of 2 years' duration. For 2 months Alexander the Great employed 100,000 men to clear away the refuse that encumbered the streets, so sadly had the once magnificent tn. fallen from its high estate. But he was unable even to finish his work of removing the debris. The difficulty in the way of conveyance of heavy stones from Armenia, the need for building material in the foundation of a new cap. on the Tigris, namely Seleucia, caused a hastening of the already rapid ruin of the city. Even in the early times of Pausanias little was standing save the walls. The Arabian



THE RUINS OF BABYLON

mean 15 m. The walls were furnished with 100 brazen gates, though the number according to Diodorus is 250. The 2 parts of the city were joined by a huge roofed bridge made of hewn stones fastened by iron clamps. Nothing as yet has been discovered of its remains. The earlier part of the city and that more truly Babylonian is the W. The famous temple of Baal, Birs Nimrud, is supposed to have stood in this portion of the city. An important pile of ruins in the W. portion is probably the remains of a royal citadel. The ruins go by the name of Mujellibe. The hanging gardens of Semiramis, situated in the E. div. and counted as one of the wonders of the world, stand among the buildings of the Neo-Babylonian period. Diodorus has written a detailed description of them. (See HANGING GARDENS OF BABYLON.) It is evident wherever one goes in B. that great damage was done by Persian conquests. The outer walls were demolished during the revolt under Darius I. and the suc-

authorities speak of a vil. Bâbl, but generally make mention more of the great masses of ruins. Naturally it has been a source of rich discovery by the antiquarian, and among the many explorers associated with this research the name of Rich stands out. The tn. of Hillah, with a pop. of 7000, is said by most authorities most accurately to represent the old city of Babylon.

**Babylon**, a fortress on the Nile in Lower Egypt. It became important first under Rom. occupation, though its origin has been stated to be Babylonian.

**Babylonia** (Assyrian Babilu, Persian Babilush), an alluvial plain watered by the Tigris and Euphrates. It now forms part of the independent Arabian state of Irak. References to it in the O.T. are made under the names Shinar, Babel, and 'the land of the Chaldees.' The varying fortunes of its successive rulers make the task of fixing its boundaries very difficult. Approximately the N. boundary from Naharaim (Mesopotamia)

was formed by a line of fortifications estab. by mutual agreement between the Assyrian and Babylonian monarchs and separating their respective kingdoms. Allusions to 'the Median Wall' by classical writers probably refer to this boundary. The Tigris forms a natural E. boundary, though portions of ter. beyond it were at times included in the Chaldean empire. Those dists. were Namri or Kurdistan, The desert beyond the Euphrates provided the W. boundary, for a margin of fertile land on its further bank was a part of the Babylonian empire. The Persian Gulf formed the S. limit, for at that time its water extended further inland. The fertility of the plain has made it at various times the most prolific corn producer in the whole of W. Asia. A network of canals constructed throughout the country acted as a fine irrigation factor. Many of these canals are navigable to-day. The chief is Nar Malka, which until the seventh century A.D. was still in use. It has now been abandoned as a result of Mohammedan neglect. It joined the Tigris and Euphrates in N. B., connecting the cities of Sippara (Sephparvaim) and Akkad, then entering the Tigris 30 m. below Bagdad.

Ant. records say that B. was divided into sev. provs. whose number and dimensions experienced many variations in different periods of the empire's hist. Primarily the most important div. was the forming of 2 large provs., Sumir or Sumer (Shinar, S.B.), i.e. the dist. stretching from the Persian Gulf to Babylon, and Akkad or N. B. The cap. of Akkad resembled Babylon in being situated on both banks of the Euphrates. The larger portion of the tn. was Sippara of Samus (the sun god) and the lesser part Akkad or Agade. It was also called 'Sippara of the Moon Goddess.' Hence the union of the 2 portions in the biblical name Sepharvaim, which means 'the two Sipparas.' Smaller provs. within these 2 main divs. were Gan-Duniyas (N. Akkad), Edina (or Eden or Zeru or Dura, the S. part of Akkad); Gambula, now Afadj; and Matkaidu, the land of the Chaldeans.

The exceptional fertility of the country resulted in the almost unbounded produce of corn and numerous other cereals, grapes and fruit of many varieties, sesame, sev. kinds of vegetables, cucumbers, melons, onions, and garlic. The only building material available was clay, which existed in large quantities, while stone had to be conveyed from the mts. of Elam or Upper Mesopotamia.

The inhab. of B. have invariably consisted of many races, as far as can be ascertained from the classical writers. The oldest inscriptions show that the earliest known inhab. belonged to the Ugro-Finnic branch of the Turanian family, who were related ethnically to the Elamites of Susiana and the Turanian Proto-Medes, in whose tongue traces are found of a connection with the Ugro-Finnic branch. This race, the Sumer-Akkadians, were not originally natives of Chaldea, but, so say their traditions, came from the mts. in the N.W., bringing

with them some idea of the advanced civilisation which they presently estab. From various sculptures indications have been found of a Semitic element in the pop. during the very early portions of the hist. of the empire. Assisted by war and commercial intercourse, other races drifted into the plain, until we find the various peoples alluded to as the 'mixed crowd of nations.' Less advanced than the Sumer-Akkadians, the Semites quickly adopted their superior methods, and rising in numbers and power with equal celerity, they had so far estab. themselves in B. that we find in 2425 B.C. a Semitic dynasty under Sargon of Agade ruling in N. B.

So many valuable tablets have been recovered from the ant. libraries that more information concerning the social life of B. is available than is the case with any other contemporary kingdom, with the exception of Egypt. A child directly after birth, if a male, was invested in the presence of witnesses with the titles and recognition due to sonship. At the end of 8 or 10 days circumcision took place, and on reaching puberty the young man was acknowledged a free-born citizen. Marriage was regarded with a very strict eye. Every woman's dowry was secured to her and on divorce was returned, and the marriage ceremony was characterised by a reverence and solemnity excelling the present-day observance. An interesting fact, too, is the regard which women, especially married women, were held in the eyes of the citizens. An offence against a mother was rigorously punished, and the right to trade and own property in her own right was freely acknowledged. Education was compulsory to freemen, tablet writing forming one of the prin. subjects. Admirable regulations existed for the welfare of the slave. He was protected from cruelty at the hands of his master, who, in the event of disablement following an injury, was compelled by law to support him.

Regularly chosen judges sat in the temple gates, sometimes in the great gate of the city, to administer the law. Those who were the prin. officials were called 'judges of the king.' Fines, forfeiture of civil status, and death were the punishments, while leave to appeal was granted. Taxes were based upon a fixed standard. The 'king's tax' was levied on all property. A revenue supported the army, to which all contributed, while those dists. most concerned paid a ship tax. Among local taxes were first-fruit tax, temple tithes (tenths), corn, date, and sheep taxes, and rates levied for the upkeep of canals and roads. The standard currency consisted of the silver coins, talent, maneh, shekel, and paras, which was first introduced in the time of Darius.

Discoveries on the site of the ant. city of Lagash yielded valuable examples of Babylonian art. Previously its only evidence was contained in a few gems and cylinders engraved with drawings. But added to these are statues of some acknowledged artistic merit. They bear

a distinct value and style from other Babylonish art, and eclipse even that of later Assyria. Of these statues the most remarkable is one representing Gudea, the prince-priest, the viceroys of the city. The statue is nearly life-size, and is executed from the hardest diorite. On it is an inscription which testifies to his restoration of the temple in 2500 B.C. Even more valuable, both from an antique and artistic point of view, is a carved head in red porphyry. Its faithful delineation of the true characteristics that mark the Babylonish physiognomy is remarkable. An inevitable conclusion is that the art of B. represented by these statues was of an order and perfection attained only after hundreds of years of development, and scarcely less interesting is the fact that only perfectly made tools could have been used. The art of casting metals, too, is proved by the discovery of many bronze figures. At Tell el 'Obeld have been found striking examples of another form of art—bitumen models plated with sheets of copper. Delicate work in gold and silver, in shell, alabaster, and lapis lazuli have been found at Ur, in tombs dating from about 3500 B.C. The same high standard of execution marks the seal-engraving. Representations of the harp, pipe, and cymbals show that music was practised in the earliest times, while mention of the trades of weaver, dyer, potter, smith, and builder testifies equally to the fine level of achievements which the Babylonish peoples reached.

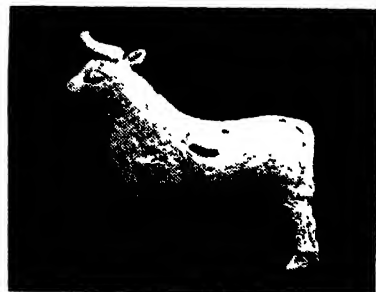
The hist. of B. has been traced back to 4000 B.C., aided by the discovery in 1888 of a temple at Nippur, and the antiquity of Babylonish civilisation is rivalled only by that of Egypt. A specimen of line writing (as contrasted with the wedge method) on a stone in the Brit. Museum refers to the reigning monarch Sargon I., king of Agade, who lived about 425 B.C. Proofs of the empire as a collection of independent cities are found in early records of the Sumero-Akkadian inhab., whose date is assigned to 4000 years B.C. Babylon was not always the anct. cap. References are found to the tn. of Uru-ki, or Erech, meaning 'the capital,' and around which a host of legends existed. Kish was cap. for a time, and Ur, the city of the moon goddess, was the seat of 3 dynasties. From the latter city Abraham came. Eridu was the 'holy city' of S. B.

About 2300 B.C. occurred the union of the independent cities into one empire. This took place under Ur-Bahu or Ur-Engur, builder of the great ziggurat at Ur, his cap. During his reign he restored many temples, and in the cities under his sway appointed priest-viceroy. Dungi, his son, succeeded him, and many inscriptions have been unearthed the work of his subjects. By this time the standard of civilisation in Chaldea had assumed a high level. Among the studies, astronomy, mathematics, and science were prominent, while the Persian Gulf was freely navigated by Chaldean ships. At this time the Babylonians were at war with the Elamites. In 2280 B.C. S.

Chaldea was successfully invaded by Elam tribes under Kudur Nakhundi. Until 2120 B.C. this line possessed great power. Two out of the kings of this period are worth mention: Kudur-Mabug, king of the W. (Syria), and Eri-aku, king of Larsa. Students of Assyria claim that this latter monarch is identical with Arioch, king of Ellasar,



BABYLONIAN OFFICIAL OR HIGH PRIEST



British Museum

BULL FROM UR

mentioned in Gen. xiv. Hammurabi (Khammuragas), overthrew Eri-aku. He was the sixth and most powerful ruler of the first Babylonian dynasty, and it is during this important period of Babylonian hist. that many political changes took place. At this time Babylon made her beginning in rising to the rank of the most powerful city in the empire. Many of the temples, specially those of Bel at Babylon, and of Nabo in Borsippa, had suffered demolition at the hands of the Elamite invaders. Hammurabi restored these, but a more important work was the construction of a canal, associated

with the Nar Malka, which crossed N. B. and Sippara. It is navigable to-day, and bears the name of Yusifien. This line lasted little more than 150 years, of which Hammurabi ruled 43 (c. 1792-49). B. then fell into the hands of the Kassites, an Indo-European people who founded a dynasty that lasted 500 years. It is chronicled more fully than any other period by contemporary historians, but few Babylonian tablets dealing with this time have been discovered. Among them, however, is a very important one, that of a memorial stone of Nebuchadnezzar I., dated 1150 B.C. It is chronicled that he usurped the throne and warred against the Assyrians, who were rising to a powerful position. A detailed and descriptive account is given of a battle against the Elamites, at whose hands the Babylonians, but for help given by an adjacent city, would assuredly have been destroyed. As a reward, immunity from taxes and the usual duty of supplying soldiers was bestowed upon the helping city. From this time until the reign of Nabunazir (Nabonassar) the hist. of B. is to be found in Assyrian sources, and any detailed or connected account is so far undiscovered. Nabonassar ruled for 14 years and ascended the throne in 747 B.C. Two Assyrian invasions occurred, though the king, said by the Assyrian chroniclers to have been defeated, still maintained his position. He was succeeded by his son in 734 B.C., but his reign lasted only 2 years, for in a popular revolt he was dethroned, giving place to Ukinziru. Under Tiglath-pileser III., king of Assyria, the Babylonian king was driven from the throne and killed in the marshy region of S. B. Tiglath ascended the throne under the title of Pulu of B. in 729 B.C. More than ordinary significance is attached to this conquest, as it brought more closely together than before the N. and S. portions of B. The Babylonians once more gained their independence during the usurpation of the Assyrian throne by Sargon III. in 722 B.C. This regaining of Babylonian independence was conducted under the leadership of one of the most successful and popular of Babylonian princes, Merodach-Baladan II. The attention of the Assyrians was occupied too fully by wars in Syria and other parts of their empire to allow them sufficiently to concentrate upon the powerful Merodach. An attempt was diverted by the action of Merodach in stirring up Hezekiah and other Syrian princes in revolt. But later the inevitable attack came, and in 710 B.C. the Babylonian ruler was completely defeated by Sargon II. in 722 B.C. This regaining of Babylonian independence was Merodach restored. Only a few months, however, elapsed before he was again deposed, this time by Sennacherib. He fled to the Elamites. Following his downfall the rule of B. was administered by various princes and viceroys appointed by Assyrian rulers. Interruptions occurred here and there in the revolts which took place on behalf of, and directed by,

native princes, but none were successful. Sennacherib, after a period of severe and strenuous fighting, defeated both the Elamites and Babylonians, who had allied themselves against him. He was succeeded by his son, Essar-haddon, who, less martially inclined, attempted the more friendly policy of dividing his time equally between his 2 courts. His power, however, was considerably weakened by the ceaseless and determined opposition he met from Egypt in Syria, and incessant harassing by the Elamites and Babylonians. In 669 Essar-haddon fell ill and associated his son, Assur-bani-pal, with him in the kingship and, on his death in 668, the son was left sole king and made his brother, Saviul-sum-yucin (Sammughes) governor of B. Assur-bani-pal was the 'grande monarque' of anct. Assyria and the empire on his accession was at the zenith of its glory, while its buildings were unequalled for size and grandeur; but constant wars left a diminished inheritance to his successor. War with Elam led to the conquest and division of that country, but soon after this the first blow was struck which eventually led to the downfall of the empire. A general insurrection suddenly took place, headed by the king's brother. The cities of Babylon, Borsippa, and Sippara were besieged, and Assur-bani-pal burned himself to death in his palace in 626 B.C. The dissolution of the Assyrian empire now took place, and the throne of B. was seized by Nabopolassar, a general of the garrison, whose wife was a princess of Media. In 625 B.C. a general invasion of Aryan and other E. tribes gave B. a chance of ridding herself of the Assyrian yoke, and in the same year Nabopolassar was proclaimed king of B. His son, Nebuchadnezzar, succeeded him in 605 B.C. This monarch speedily made Babylon raise her head, and without doubt he can be said to be the greatest of all the sovereigns who ever ruled over the anct. empire. He reigned for 43 years, and during that long time B., all her lost possessions once more regained, was able to take her place as the foremost nation and empire in the world. With few exceptions every building of any significance at all was rebuilt, and every mound in B., so far explored, has revealed bricks bearing his name. He captured Jerusalem in 599 B.C., and later, owing to its continued unrest, he destroyed the city and put into prison Jehoiakim. His son, Evil-Merodach, succeeded him, and promptly released Jerusalem's former ruler in 561 B.C. Evil-Merodach was murdered by his brother-in-law, Nergal-Shorezer, a 'chief seer' of one of the temples. In 556 B.C. the throne was usurped by Nbu-naid (Nabonidus), a powerful prince, whose reign ranks next to that of Nebuchadnezzar in importance. In almost every temple, the inscriptions speak of Nbu-naid, and record important historical information. We learn from a cylinder discovered at Sippara that he rebuilt the temple at Karran, which had suffered destruction from the Scythians, and further, it records that Cyrus defeated



Astyages, king of the Medes, in 550 B.C. Cyrus took Ecbatana from him in the same year. He left Babylon and went to Tema, the modern Teima, in Arabia; in his absence Belshazzar was appointed by him as governor. Finally Cyrus attacked and took Babylon 539 B.C.; apparently some Babylonian sympathies were on the Persian side against Nabonid. The kingdom now suffered invasion at the hands of Cyrus, who advanced as far as Sippara, where the garrison surrendered to him. Babylon was taken with almost equal ease, and Cyrus appointed Gobryas as ruler. In 538 B.C. B. became a Persian prov., and a period of peace under Cyrus and Cambyses appears to have followed. But the dominant spirit of revolt rose again on the accession of Darius, son of Hystaspes, and for 3 years the rebellion lasted. But it was put down finally by Nidintabhel, who claimed to be Nabuchadnezzar II. However, the irrepressible Babylon again rebelled in 513 B.C., under Arakha, a native of Armenia. Presently the Persian rule was destroyed, and for a short time Alexander the Great ruled over the city. He gave orders that the great temple of Bel (the tower of Babel) at Babylon should be restored, and archaeologists have found proof that the site was actually cleared. The actual rebuilding did not take place, for, in 323 B.C., Alexander d. Meanwhile a conference had been held at Triparadisus, and Seleucus had been promised the succession. Antigonus contested his claim, but it was finally won by Seleucus I. in 312 B.C. It was taken from the Syrians in 140 B.C. by the Parthians. For a brief period the empire came under Rom. rule, under Trajan in A.D. 114, Septimius Severus in A.D. 193, and again in A.D. 363 under Julian. In 650, under Mohammed's successors, the prov. of B. became a seat of the caliphs, and the tn. of Bagdad was built in it (762-66). This lasted till 1258. Four centuries later the Turks, for the second time, wrested it from the Persians, and from that time it was divided into Bagdad and Basra, under the dominion of Turkey. Both provs. were occupied by the Brit. in the First World War, Basra in 1914, Bagdad in 1917. By the treaty of Sévres, 1920, the land of Iraq (Mesopotamia) became an independent state under Brit. mandate, and in 1921 the Arab state of Iraq came into being, the Emir Feisal (q.v.), son of the king of the Hejaz, being crowned king.

The excellence of the administration and the high level of civilisation which have been mentioned elsewhere, and the commerce, carried on by means of caravans, with Bactria, Persia, and Media, and by shipping with Arabia, speak for the general prosperity that the kingdom enjoyed. The true Babylonians, or the Sumero-Akkadians, possessed literary inclinations in a most marked degree. The large number of inscriptions executed by private persons, and the numbers of people of highest rank who also belonged to the 'writing class,' form sufficient evidence to testify more than ordinarily to the

excellence of their attainments. In the inscriptions on some of the tablets have been discovered directions to intending students as to the method of getting a 'book' from the library, while the arrangement of the works was in thorough order, and maintained with scrupulous care. Naturally the literature of B. was affected by native schools of thought. This meant that the various depts. of literature reflected to some degree the teachings of the various temples. Of the specimens of Babylonian literature one of the most perfect is a tablet containing a description of a war in heaven between the god Merodach, or Marduk, and the evil spirit Tiamot. This valuable tablet was discovered in the library at the temple of Nebo, in the town of Borsippa. There is a Babylonian version, as well as one in Assyrian. Described in language exceptionally beautiful is the story of Merodach's task, given by the gods, of battling against all the forces of evil. Concluding the last victory of Merodach is a hymn of praise of extraordinarily perfect language and expression. Every subject known at the time is represented in the various libraries. Hist., mythology, theology, astronomy, astrology, magic, arts of divination, geography, myths, fables, poems, and proverbs, all are included. In the proverbs is a very curious one relating to Zu, the god of the birds. We are told how he stole the secrets of the gods and the tablets of destiny, and brought them to earth. For this sin he was driven to the mts., where he was confined. A noteworthy distinction existing between Assyrian and Babylonian literature is the curious fact that in Assyrian all credit is taken by the king for its literature, while in Babylonian the names of the various authors are borne on the tablets.

The varying occupations and successes of the Babylonian races necessarily point to equally changing religions. The earliest known indications of worship belong to the Sumero-Akkadian people, who practised a kind of fetishism or Shamanism. This acknowledged the existence of an inner spirit within every object in nature. This doctrine created a body of medicine men, whose powers were only sought and used against those forces of nature which were regarded as hostile to man, e.g. sicknesses, etc. Many of the hymns of these 'priests' have been discovered in the libraries of Nineveh and Babylon. As their knowledge grew, so did their army of gods, and hence we find the gradual formation of a hierarchy of gods called the spirits of heaven and earth. This gave place in time to a conception of the spirit of heaven and the spirit of earth as creators, or Dingiri. From these arose a number of lesser gods, each city differing from the other in its choice of that which was held most sacred. Girdlu seems to have been one of the oldest seats of religion. Here Ea, the god of the sea, was supreme. He is embodied in a symbol half fish-like, and Berosus says he taught the first elements of learning to the Chaldean people. His

female companion was Dav-Kina, the 'lady of the earth.' Thus it will be seen that the Chaldeans regarded water and earth as the 2 fundamental elements of matter, and also the only 2 materials from which the earth was made. The son of this pair was Tammuz, who was replaced by Merodach. Tammuz had a wife named Ishtar, and the worship of this couple extended over a large portion of the Babylonian empire. The next god, according to rank, was Mul-lil, or Enlil, whose sacred city was at Nippur. This god it was who caused the destruction of wicked men. His wife was the 'lady of the great land,' or Hades. She was the queen who ruled over the land from which there was no return. They had a child named Naptar, the demon of fever. His work was the spreading of disease. The moon-god was another descendant of Mul-lil, and presently he rose to be greater than his father. He was estab. most firmly in the city of Ur, and soon became an influence upon the countries of Syria and Arabia, and on the city of Haran (see CARRAN). There is much sacred poetry in Chaldean, but none is so beautiful as the hymns to the moon-god. In Sippara and Akkad particularly, and more or less throughout the whole empire, the Semites influenced the religion so much that their god, the sun god, soon became pre-eminent. Its highest development existed at Sippara, and a tablet in the Brit. Museum has portrayed upon it a representation of the sun god with priests and kings in the act of worshipping the sacred sun-disk. This god later became the Baal that absorbed the entire army of lesser deities. In the religious hist. of the later empire Merodach assumes a high place, and abstention from his worship was punished. His temple was one of the architectural wonders of the world. Next in importance was Nebo, with his consort Tasmit. They were worshipped at the Eridu temple, the largest seat of learning of Chaldæa.

**Recent Discoveries.**—Scientific excavations are continually being made on the sites of B.'s anct. cities, and at 3 of the oldest tns., Kish, Ur, and Eridu, great discoveries have been made. The Sumerian king-lists state that after the Flood there were dynasties first at Kish, then at Erech and thirdly at Ur. The first 2 are probably mainly legendary, for the kings are said to have ruled from 160 to 1200 years each, but confirmation has been found of the early dynasty at Ur. from a tablet unearthed from the site of Tell el 'Obeld, which states that the temple there was built by A-an-ni-pad-da of Ur, who was the second ruler of Ur's first dynasty, c. 3300 B.C. Excavations at Ur itself have revealed direct evidence of the Flood in a bed of water-laid clay, 8 ft. thick, below which are found the painted pots and flint implements of a non-Sumerian race bearing no affinity to the civilised metal-using people whose remains are found above. Some distance above the flood-clay, a tomb has been discovered, containing 4-wheeled chariots

(the earliest known), the remains of sacrificed slaves, and much delicate metal-work. This tomb dates from about 3500 B.C., and demonstrates the advanced state of B.'s civilisation even at that early date, and also the extent to which she traded, for neither metal nor wood was to be found within her borders. Of Ur's second dynasty little has been found; the third was that founded by Ur-Engur about 2300 B.C. The excavations of Ur were undertaken by the Brit. Museum in 1918, and by the Brit. Museum and the Univ. of Pennsylvania from 1922 onwards. Work was done under the direction of Mr. Leonard Woolley, to whom, and to the late Dr. H. R. Hall, is due also the discovery at Tell el 'Obeld, 4 m. away, of the oldest building known. In 1918 the site of Eridu was excavated by Mr. R. Campbell-Thompson. Very old inscriptions were discovered, and it was found that Eridu, now far from the coast, must in her days of power have been a seaport, and in all probability an importer of building stone. Kish was excavated, 1922-24, by Mr. Ernest Mackay for the Herbert Weld and Field Museum expedition, which worked on behalf of Oxford Univ. and Chicago. Here also evidences of the Flood were found. At Babylon itself a Ger. expedition, although unable, owing to the presence of water, to explore the deeper strata, revealed enough to give a clear impression of the construction of Nebuchadnezzar's palace there. The great Ishtar Gate, as excavated 40 ft. high, is especially remarkable. Like the rest of the city it is constructed entirely of brick; it is adorned with 9 rows of dragons and bulls in relief; and used to be covered, in Nebuchadnezzar's time, with a glaze of brightly coloured enamel. Babylon's ziggurat, the true Tower of Babel, has also been investigated. This work is continuing and massive walls and fortifications are coming to light. There is still much work for the archaeologist in B., for none of the cities has as yet been completely excavated, and many have been barely begun. Nor is it in B. alone that discoveries may be found to throw light on her hist., for the famous Code of Hammurabi and the stele of Naram Sin were found, spoils of conquest probably, in Susiana. See also under ASSYRIA.

**Bibliography.**—Sir H. C. Rawlinson, *Cuneiform Inscriptions of W. Asia*, 1857-1884; Oppert, *Histoire des empires de Chaldée et d'Assyrie*, 1865; Sayce, *Fresh Light from the Ancient Monuments*, 1885, and Hibbert Lectures, 1885; H. Radan, *Early Babylonian History*, New York, 1900; C. H. W. Johns, *Babylonian and Assyrian Laws, Contracts and Letters*, Edinburgh, 1904; Sir M. A. Budge, *Babylonian Life and History*, 1925, and *Rise and Progress of Assyriology*, 1925; Louis J. Delaporte, *Mesopotamie*, 1925; C. L. Woolley and H. R. Hall, *Al 'Ubaid*, 1927; D. Mackay, *The Ancient Cities of Iraq*, 1926; H. R. Hall, *Ancient History of the Far East*, 1927; *Universal History of the World*, vols. 1. and II; and C. L.

Woolley, *The Sumerians*, 1929, and *Ur of the Chaldees*, 1935.

**Babylonish Captivity**, the name given to the deportation of Jews from Judea to Babylon, after the capture of Jerusalem by Nebuchadnezzar. The migration went on for 70 years, till the Jews were allowed to return to their own land by Cyrus, who had conquered Babylon; those who returned were exclusively of the tribes of Judah, Benjamin, and Levi.

**Baby Pulo**, see BABI ISLANDS.

**Babyroussa**, see BABIRUSA.

**Baca**, Valley of (Heb., valley of balsam trees), is a place mentioned in the O.T. (Ps. lxxxiv. 6), and is probably El-Bake'a, which lies between Jerusalem and Bethlehem.

**Bacacay**, a tn. of Luzon, Philippine Is., on the gulf of Tabaco. It is in a fertile dist., but is frequently disturbed by the volcano Mayon. Pop. 20,000.

**Bacarra**, a tn. of Luzon in the Philippine Is., 4 m. N.E. of Loag. It is situated in a fertile dist. in the prov. of Ilocos Norte. Pop. 14,500.

**Bacca**, the technical name for the fruit commonly called by the name of berry. It is used to designate those fruits which have a thin skin, are pulpy internally, and have sev. seeds lying loose in the pulpy mass, e.g. the gooseberry, currant, and vine.

**Baccarat**, vulgarly called 'bac,' a card game of chance, said to have been introduced into France during the reign of Charles VIII., since when it has had widespread popularity. There are 2 types of the game—*baccarat à banque* (or *baccarat à deux tableaux*) and *baccarat chemin de fer* (q.v.). The rules of the game are intricate. In this country B. played for stakes is illegal, being a card game not involving skill, but on the Continent it is one of the most vicious and persistent gambling games.

**Baccarat** is a tn. situated in the dept. of Meurthe-et-Moselle, France, 15 m. S.E. of Lunéville. It has most extensive crystal works. Pop. 6000.

**Baccha**, a genus of dipterous insects of the family of Syrphidae. It is remarkable in that the species have the 2 basal joints of the abdomen very long and slender, but the remaining joints depressed and suddenly increased in breadth. It is generally of a black or bronze colour, with yellow spots or markings, and is found in Britain.

**Bacchæ**, the women who took part in the wild orgies of the Bacchanalia, a festival of Bacchus, the Rom. god of wine. They were variously known as B., Bacchantes, and Menades.

**Bacchanalia** (from Bacchus, Gk. Βάκχος, the god of wine) were feasts in honour of Bacchus. Men and women, intoxicated with wine, clothed in deer-skins and Asiatic robes and carrying *thyrsi* (i.e. staves wrapped round with ivy and vine leaves) in their hands, ran about beating drums and cymbals, and crying to Bacchus. They were first introduced at Rome 187 B.C. (Liv., xxxix. 8-10). These feasts were celebrated every third year, and were hence called Trieterica.

**Bacchante**, a priestess or female votary of Bacchus. The representation of B. was popular among classical sculptors.

**Bacchiglione**, a riv. in Venetia, N. Italy. It rises in the Alps, and after passing Vienza and Padua flows into the Adriatic Sea opposite Chioggia. Its total length is 90 m., and it is navigable to Vicensa.

**Bacchius**, a Gk. writer, sometimes incorrectly called Vacceus. He was the author of *An Introduction to the Art of Music*, in questions and answers, a work contained in the collection of Meibomius. It is not certain when he lived.

**Bacchus**, a name used by the Gk. and Rom. writers for Dionysus, the god of wine. Traces of its use in Gk. are found in the period succeeding Herodotus. It commenced more particularly as an ordinary surname, later developing into a term of opprobrium. Though it finally was adopted to signify the wine god, it only applied, so far as the Gks. used it, to the spirit that pervaded an abuse of wine, being therefore more truly the god of the carouse. Here and there its name Dionysus is used in Lat., though the Augustan poets used the alternative invariably. The worship of B. was originally introduced into Rome from Greece, when B. was identified with the It. deity Liber, a god of some antiquity, who was the spirit pervading and controlling the destinies of planting and the cultivation of fruit. The worship of Dionysus was no part of the original religion of Greece, and in Homer he is described simply as the god who teaches man the preparation of wine. On every 17th day of Mar. the Liberalia festival was held, at which youths were invested with the toga virilis, thereby proclaiming their manhood; but this feast is quite separate from the Bacchic festivals (Dionysia) which were of a wild and dissolute character, and were, at length, abolished in 168 B.C., by order of the senate. See Louis Dyer, *The Gods of Greece*, chaps. iii. and iv.; Lewis Campbell, *Religion in Gk. Literature*; and Sandys, *Introduction to the Bacchæ of Euripides*.

**Bacchylides**, a Gk. lyric poet, a native of the is. of Ceos. His period is said by Eusebius to be about 500 B.C. The earliest of his odes is dated roughly at 479 B.C. He lived at the court of Hiero I. of Syracuse (478-467). There are evidences that Hiero showed a preference for B.'s odes to those of Pindar, and a rivalry is supposed to have developed between the 2 poets, which, however, did not result in bitter feeling on the part of B. His writings are characterised by simplicity and picturesque detail. B.'s poems are of 2 kinds, odes to victory and dithyrambs, or passionate hymns. Among recent discoveries in anct. literature must be included his *Odes*, which were found inscribed on an Egyptian papyrus, ed. by Kenyon, 1897. Best ed. Jebb's, 1905.

**Bacciocchi**, Felice Pasquale (1762-1841), b. at Ajaccio, Corsica. He was a captain of infantry, and married Elisa

Bonaparte, the sister of Napoleon I. He became a senator in 1804, and was made a general and prince of Lucca and Piombino in 1805. He d. at Bologna.

**Bacciocchi, Marianne Elisa** (1777-1820), the eldest of Napoleon Bonaparte's sisters, b. at Ajaccio in Corsica. Married (1797) Capt. B. (q.v.) of the Royal Corsican Regiment. On Napoleon's assumption of the imperial crown, she became princess of Piombino and soon after of Lucca. In 1809 she became, by decree, grand duchess of Tuscany. On the downfall of her brother she went to Bologna, where she passed under the name of Countess of Campaniano.

**Baccio d'Agnolo**, see AGNOLO, BACCIO D'.  
**Baccio della Porta**, see BARTOLOMMEO, DI PAGHALO DEL FATTORINO, FRA.



E.N.A.

JOHANN SEBASTIAN BACH

**Bach, Johann Christian** (1735-82), eleventh and youngest son of Johann Sebastian, was b. at Leipzig. After his father's death he studied under his brother Emanuel at Berlin. He became a pupil of Padre Martini in Italy in 1754, and in 1760 he was appointed organist at Milan Cathedral, for which he composed some masses. In 1762 he accepted an invitation to England. His success was rapid, and his operas and concerts were enthusiastically received. He soon became music master to the queen. Of his operas *Orione*, 1763, and *La Clemenza de Scipione* were the best, but his work was not destined to endure, and to-day his compositions are all but forgotten.

**Bach, Johann Sebastian** (1685-1750), in the front rank of the great musicians of the world. He was b. at Eisenach. He came of a family of noted musical

talent. Two of his father's cousins, Johann Christoph B. and Johann Michael B., are worthy of mention, as their influence upon their relative was in some degree responsible for the great result. Before B. was 10 his father, Ambrosius, d. The boy was cared for by his brother Christoph, an organist at Ohrdruf. The extraordinary talent shown by Sebastian excited his brother's jealousy, and a M.S. of organ compositions by great masters was sedulously withheld from the prodigy. However, Sebastian obtained access to the book, and copied its contents by moonlight in order to escape detection. The disagreeable result was the confiscation of his copy immediately following its discovery. The work had taken the boy 6 months to accomplish. His beautiful soprano voice led him to a place in the choir at St. Michael's school at Lüneburg, where he practised as an accompanist on the harpsichord and as a violinist at the breaking of his voice. This was in 1700, and 3 years later he obtained a royal appointment at the court of Weimar, where he became acquainted with much It. music. In the succeeding year he became organist at the new church of Arnstadt, and here he began to compose. His brother's alliance with the Swedish Guard led to the composition in 1704 of the *Capriccio on the Departure of a Brother*, which work was followed and also preceded by sev. of his church cantatas. At this time B. obtained permission to go to Lubeck in order to hear the great Dan. organist, Buxtehude, then 70 years old. His enthusiasm led him to exceed his time of leave, and this, with other reasons, led to a fresh appointment at Mülhausen. He only stayed here a year, during which he married a cousin, Maria Barbara B. At the age of 18 his executive skill on the organ and pianoforte obtained him various appointments, the most important being that of court organist at Weimar. Here he spent 9 years, and composed the best of his cantatas, while a close study of It. masters gave him a thorough mastery of their style, the foundations being thus formed for the later instrumental work he produced. On one journey from Weimar in 1717 rivalry sprang up between the supporters of B. and those of a Fr. harpsichord-player, Marchand. The 2 men concerned became involved, and a challenge was exchanged. On the day fixed for the trial the Fr. musician was nowhere to be found, his better feelings and genuine acknowledgement of B.'s superiority being the causes of his flight. In 1720 his wife d., and in the following year he married Anna Magdalena Wülken, who assisted him by copying his musical scores for him. From this time B. commenced the composition of his suites, while the first half of the *Forty-eight Preludes and Fugues* was also written, though many years separated the first from the complementary portion. In 1722, after some difficulty, B. was appointed to the vacant position of cantor of the Thomasschule at Leipzig. Here all his finest choral work was written, in which

is contained the 2 settings of the story of the Passion and the Mass in B minor. In 1736 he presented 2 movements from the latter composition to Augustus III., and received the appointment of Hofcomponist. In 1747 he visited Frederick the Great at Potsdam. The king, himself a musical amateur, received him with distinguished marks of regard. A few years later his eyes became painfully troublesome, and total blindness resulted from an operation. Apoplexy caused his death, aggravated by the remedies used during the unhappy operation. Besides his musical compositions, B. wrote many clavier and harpsichord pieces, and introduced improvements in fingering, though modern fingering came only with Clementi (1752-1832). B. tuned his instruments in accordance with 'equal temperament,' exemplifying its possibilities in the 'Fortyeight.' As an organist he was supreme in his day and his organ compositions include the so-called *Chromatic Fantasia*. There are early biographies and critical works by Philipp Emmanuel Bach, C. H. Bitter, P. Spitta (trans. 1899), and E. Heinrich. Later works on B. are: A. Pirro, *L'Esthétique de J. S. Bach*, 1907; C. H. H. Parry, *Johann Sebastian Bach*, 1909 (rev. ed. 1934); H. Grac, *The Organ Works of Bach*, 1922; C. S. Terry, *Bach: a Biography*, 1927, *Bach's Orchestra*, 1932, and *Music of Bach*, 1933; Albert Schweitzer, *J. S. Bach* (trans. by E. Newman), 1935; E. M. and S. Grell, *Bach*, 1947.

**Bach, Karl Philipp Emanuel** (1714-88), the third son of Johann Sebastian, was born at Weimar. In his youth, though he studied under his father he intended to adopt the legal profession. In 1738 he graduated, but soon abandoned the idea of a legal calling and decided to devote his life to music. In 1738 he went to Berlin, where he became private pianist to the king. His favourite instrument was the clavier, for which he composed about 200 pieces, while his *Versuch über die wahre Art das Clavier zu Spielen* was recognised as an epoch-making book in the hist. of music. In 1768 he went as musical director to Hamburg. At Hamburg he composed his famous oratorio, *The Israelites in the Wilderness*, and his *Sonaten für Kenner und Liebhaber*, which is his greatest work. He d. at Hamburg. The works of Karl Philipp have suffered an undeserved eclipse in recent years.

**Bach, Wilhelm Friedemann** (1710-84), the eldest son of Johann Sebastian, was naturally the most talented in the family, but his career was ruined by idleness and vicious habits. In 1747 he was appointed musical director of the Liebfrauenkirche at Halle, but lost this position owing to his dissolute habits. He lived a vagabond life thenceforward, and d. in extreme want at Berlin. Some of his fugues, polonaises, and occasional pieces are extremely fine.

**Bachan**, see **BATCHIAN**.

**Bacharach**, a tn. in the Rhineland of Germany, beautifully situated on the l. b. of the Rhine. There are some very interesting medieval remains, including a

Gothic church of the thirteenth century. The tn. has been an important centre in the wine trade. Pop. 2000.

**Bachaumont, Louis Petit de** (1690-1771), a Fr. man of letters, and a prominent member of the set which frequented Mme Doublet's *salon* for 40 years. His minor publications are: *Essai sur la Peinture, la Sculpture et l'Architecture*, 1751; *Mémoires sur le Louvre*, 1750; but he is chiefly remembered in connection with the *Mémoires secrets pour servir à l'histoire de la république des lettres*, which was pub. in Paris, 1771, in 6 vols., and was afterwards extended to 36 vols. by Pidansat de Mairobert and Mouffle d'Angerville.

**Bachelier, Jean Jacques** (1724-1806), a Fr. painter, b. in Paris. He was a director of the porcelain factory at Sèvres and also of the Academy of Painting, Sculpture, and Naval Architecture at Marseilles. In 1765 he founded an industrial school of art at Paris. He was received into the Fr. Academy as a flower painter in 1751 and as a historical painter in 1763, and exhibited at the Salon regularly between 1751 and 1767. His best-known works are 'The Death of Abel' and 'Cimon in Prison.' He is the author of *L'Histoire et le secret de la peinture à la cire*, 1755.

**Bachelin, Auguste** (1830-90), a historical, genre, and landscape painter, b. at Neuchâtel and d. at Berne. He was a pupil of Moritz at Neuchâtel, and then went to Paris (1850), where he studied under Gleyre and Couture. He exhibited at the Paris Salon from 1857 to 1874, at first confining himself to genre and landscape. In 1859 he accompanied Garibaldi's volunteers, after which he painted many military and historical scenes. The following are among his best works: 'March of a Swiss Battalion,' 1860; 'Bourbaki's Army entering Swiss Territory'; 'Death of Ensign Montmollin,' 1866; 'Haymakers of the Alps,' 1863; 'Wrestlers of Hasli,' 1867.

**Bachelor**, a word of uncertain etymology, probably derived, through the Fr., from Low Lat. *baccalarius*, a word used in the eighth century of a servant, male or female, who assisted on a farm; cf. *baca*, Low Lat. for *vacca*, a cow. (1) The word B. was early applied to a young knight or novice in arms who had no following of his own but fought under the banner of another. (2) It was also used of monks in the early stages of their order who performed menial duties. (3) It was adopted in univ. life. See **BACHELOR OF ARTS**. (4) In the popular sense of the word, it is used of an unmarried man, or candidate for matrimony. In Rome legislation placed unmarried men (*cælibes*) under certain disabilities, the chief of which were contained in the Lex Julia et Papia Poppæa in A.D. 9. The object of such legislation was to encourage citizens to bring up children for the State. Penalties on Bs. were also inflicted in Sparta and at Athens. In England, too, higher taxes have, from time to time, been imposed upon Bs., but chiefly with a view to raising money for

some additional State expenditure. In 1695 an Act was passed by which Bs. and childless widowers had to pay a yearly tax of 1s. up to £12 10s. according to rank. In 1785 a higher tax was imposed for the servants of Bs., and in recent years deductions in income tax have been allowed to married persons with children. See CELIBACY.

**Bachelor of Arts**, for derivation, see BACHELOR. The word was first adopted into univ. life in the thirteenth century. Pope Gregory IX. introduced the word *baccalarius* to indicate one who had undergone the first academical examination, but was not yet a 'master' or 'doctor.' The word was altered by a pun to *baccalaureus*, as if it were connected with *bacca lauri*, laurel berry. See DEGREES.

**Bachmann, Charles Louis** (1716-1800), a Berlin violin-maker and distinguished musician. His violins and viols are much sought after; he invented the screw-pin. In 1770 he founded with Benda the concert of Berlin amateur players, which lasted for 30 years.

**Baciccio, Giovanni Battista Gaulli** (1639-1709), an It. painter. He was b. at Genoa, where he received instruction in design and colouring. Later he was a pupil of Bernini at Rome, where he painted portraits of the 7 popes and the cardinals of his time. He is also famous for historical compositions, and he painted frescoes and ceilings in churches. His best known works are those in the angles of the dome of St. Agnes in the Palazzo Navona; the 'Assumption of St. Francis Xavier' in the vault of the church del Gesù; the picture of St. Anne kneeling before the Virgin and Child; and the altar-piece of the 'Death of St. Saverio' in the church of Sant' Andrea.

**Bacillus** (dimin. of Lat. *baculus*, a rod), a genus of Schizomycetæ, but popularly confused with bacteria. The B. has like bacterium a rod-like formation, but is distinct as being larger, non-motile, and has a different method of reproduction. The Dan. scientist Müller first named this type about 1840. This species is present in phthisis and other tubercular diseases. Dr. Yeo describes bacilli as ranging from a quarter to half a blood corpuscle in length.

**Back**, see SPINE.

**Back, Sir George** (1796-1878), a Brit. Arctic explorer, was b. at Stockport. In 1808 he entered the Navy, but was made captive by the Fr. in Spain. He was associated with Franklin in 3 polar expeditions in N. America. In 1833 he commanded in the expedition organised in search of Sir John Ross. During the expedition he suffered great hardships, but discovered Arctillery Lake and the Great Fish R. On his return he was made captain. In 1836 and 1837 he continued his Arctic expeditions. In recognition of his valuable discoveries the Geographical Society awarded both its medals to him. In 1839 he was knighted, and in 1857 he was made admiral. During the years of his retirement he suffered from ill-health. His works are a *Narrative of an Expedition*

in *H.M.S. Terror*, 1838; and a *Narrative of the Arctic Land Expedition*, 1830.

**Bacillus pestis**, see under PLAGUE.

**Backbond**, a term used in Scottish law for a document which shows that the holder of a title receives it only in trust, and is accountable for its use to its real owner.

**Backboned Animals**, see VERTEBRATES.

**Backer, Adrien** (1636-86), a Dutch painter, nephew of Jakob B. (q.v.). He was b. in Amsterdam, and in early youth studied in Italy. He executed chiefly portraits and historical pieces. There is a fine picture of the 'Judgment of Solomon' in the town hall of his native city.

**Backer (or Bakker), Jakob de** (1609-1651), a Dutch painter, b. at Harlingen; studied under Lambert Jakobz at Leeward and afterwards under Rembrandt at Amsterdam. He is chiefly known for his portraits, which he executed with remarkable facility and speed. He also painted historical subjects. There is an excellent head of Brouwer by this artist in the collection of the former elector palatine, and a picture of the 'Last Judgment' is in the cathedral church at Antwerp.

**Backergunge**, see BAKARGANJ.

**Backgammon**, a very old game in England which until the seventeenth century was called 'the tables.' The obvious derivation of the word is 'back game,' as it is necessary in order to win, to bring one's 'men' back from the opponent's tables into their own, and also from the penalty attached to the pieces of going back to its starting point. A similar game, 'the twelve-line game,' was in vogue among the Romans, which consisted of a board, pieces, and the throwing of a dice which controlled the movements of the respective pieces. The game is played in France, where it is called tric-trac, from its noise occasioned by the throwing of the dice. The game is one more of chance than of skill on account of the large part played by the dice-throwing. The board or table consists of 2 parts or 'tables.' At each end of the table are 6 points, alternately coloured white and black. Two persons take part in the game, owning each 15 pieces. The 2 sets of 15 are one black and the other white. At the commencement of the game the pieces are placed at particular places on the table. Two dice are used, and each person has his own dice box, though the dice themselves are used by both parties. The throws are alternate. In the event of a 'doublet,' i.e. the throwing that results in 2 similar numbers, the number signified by the dots may be doubled. Those numbers indicated accidentally by the dice when thrown bear a certain relation to the points of the table, and it is necessary to observe the position of the men on the points in order to understand the connection and the regulations that control movements. The persons sit at the tables so that the points of their opponents face them. Suppose one player be called Black and the other White. The question of 'starter' is decided by

a throw of the dice, the higher score being the determining factor. The men are moved from point to point. The direction of White's moving is from Black's right-hand table to Black's left-hand table, then to White's outer table, and thence to White's inner table, completing the journey. Black's path is, of course, vice versa. The number signified by the dice, when thrown, indicates the number of points the thrower is allowed to travel unless the point at the end of the number is blocked by having 2 or more of his adversary's men upon it. The number indicated by the dice may be taken wholly with 1 man or shared between 2, so that each takes the number separately indicated. It is compulsory for a player to move the whole number signified if able. A 'point' is made by a player on placing 2 of his men on the same point. A 'blot' is that point occupied by 1 man; and it is cancelled by the arrival of an opponent who thus compels the previous occupant to go back to the bar. The numbers of the points count from the ace-point as 1, 2, 3, 4, 5, 6, and the man sent back to the bar is only allowed out again when the throw of the dice corresponds to the number of an unblocked point. While he has a man to enter, a player may not move any other man. When all his men are in his inner table, or 'home,' the game is continued by that player for the purpose of removing his men from the board by throwing a number that corresponds with the point he wishes to empty. He may make a move with any number instead of bearing a man away. When 6 is empty, the same number being thrown is able to empty the other points, though, of course, singly. It is possible for a player to be hit on a blot while bearing his men off the board. In this case he must enter on his opponent's inner table and must move the man into his own inner table before he may continue taking his men off. The winner is he that succeeds first in removing all his men from the table. The degrees of winning are as follows: 1. A 'single' win if his opponent has begun bearing. (This is called a 'hit'.) 2. A 'double' game if the adversary has not borne a man. (This is a 'gammon'.) 3. A 'triple' win if the opponent has a man in the opponent's inner table. In the event of a series of games being played the beginner of the next is determined by the degree of victory. If a 'hit' is won the victor begins; if a 'gammon,' a single die must be thrown. The winner of 2 games of 3 wins the 'rub.'

There is a Russian game called Russian B., which is in bulk similar to the Eng. game, as it varies in only a very few rules from the latter.

**Backhaus, Wilhelm** (b. 1884), eminent Ger. pianist, b. in Leipzig. He studied music at the conservatoire, Leipzig, under Alois Reckendorf until 1899, and Eugen d'Albert at Frankfurt-on-Main. From 1900 he made many concert tours throughout Europe and America, and his brilliant technique won for him a reputa-

tion as one of the foremost pianists of the day. In 1905 he won the Rubinstein prize in Paris, and in the same year was appointed prof. of the piano at the Royal College of Music in Manchester.

**Backhuysen, Ludolph** (1631-1708), Dutch painter, b. at Emden, Hanover. His masters were Evertdingen and Dubbels. He is famous as a painter of seascapes, which are marked by their vivid realism.

**Backnang**, a tn. of Württemberg, Germany, on a trib. of the Neckar. It has tanneries, and manufs. boots and cloth. Pop. 10,000.

**Backwardation**, a term used on the stock exchange for a sum of money paid by a seller of stock to the buyer in order that he may delay its delivery until the following account.

**Backwell, Edward** (d. 1683), a London goldsmith and banker at Unicorn, Lombard Street, one of the founders of the system of bank-notes. He had financial dealings with Oliver Cromwell, Charles II., and the queen mother, most of the nobility of the day, and with the E. India Company and sev. leading city firms. In 1662 he was sent to Paris on the matter of the sale of Dunkirk, and was employed on many secret services between Charles II. and Louis of France. He was alderman for Bishopsgate, 1657, and M.P. for Wendover, 1679 and 1680.

**Bacninh**, or **Bakninh**, cap. of the prov. of B., is in Tongking, about 16 m. N.E. of Hanoi. It was captured by the Chinese in 1884; pop. of prov. 396,000.

**Bacool**, or **Bacolat**, former cap. of Negros, Philippine Is., now of the prov. of W. Negros. It is noted for its fishing; pop. 20,000.

**Bacoler**, a tn. of the prov. of Pampanga in the Is. of Luzon, Philippine Is., situated 40 m. N.W. of Manila. The Is. grows spice, and has a pop. of about 10,000.

**Bacon**, a smoked meat product prepared from the sides, back, and stomach of hogs. In the Brit. trade B. generally consists of the whole side or half the side of the hog, or the half with only the shoulder end taken away; in America, of the smaller end from the back or stomach. Salt for preservation was used long before the preservation of food had reached its present stage of development. Pigs were cut up, put in brine tubs, and then smoked in an open chimney. The principle of B. curing is much the same to-day, but with the exception that it is now done in factories. Hams are often cured separately and sugar or molasses superadded to the salt. In Great Britain the B. industry has been reorganized in accordance with the recommendations of the commission on pigs and pig products, and after 1936 there was in operation a quota scheme regulating imports in order to secure price stabilisation. See Pig.

**Bacon**, a tn. on the W. coast of the Camarines Isthmus, Luzon, Philippine Is., in a fertile dist.; pop. 13,000.

**Bacon, Anthony** (1558-1601), a diplomatist, elder son of Sir Nicholas B., and brother of the great Francis B. In 1573

he went into residence at Trinity College, Cambridge, his tutor being John Whitgift, afterwards archbishop of Canterbury; in 1576 he was admitted with his brother a member of Gray's Inn. In 1579 he undertook a long continental tour, when he made the acquaintance of Montaigne, the essayist, Danæus, an eminent Protestant theologian, and many of the leaders of the court of Henry of Navarre. He returned to England in very bad health in 1591. In 1592-93 he was returned to Parliament as member for Wallingford. In 1593 he entered the service of the earl of Essex, and undertook to keep him posted in foreign information, and as his private 'under-secretary of state for foreign affairs,' was in constant communication with numerous foreign ambas. Many of Bacon's letters remain in MS., much of which is preserved in Lambeth Palace library. In 1597 he was returned to Parliament as member for Oxford. See Dr. Abbot's *Bacon and Essex*, 1877; Todd's *Cat. Lambeth MSS.*

Bacon, Delia (1811-59), an Amer. authoress, sister of Leonard B. (q.v.), b. at Tallmadge, Ohio; a schoolmistress, and a lecturer in hist. and literature at classes for women. Wrote sev. stories: *Tales of the Puritans*, 1831; *Bride of Fort Edward*, 1839. Though the idea did not originate with her, she was one of the earliest and most enthusiastic supporters of the theory that Shakespeare was not the writer of the plays called by his name. She came to England to study the question, and became a friend of Thomas Carlyle and Nathaniel Hawthorne. In 1857 she pub. *Philosophy of the Plays of Shakespeare Unfolded*, in which she expounded her theory that the so-called Shakespeare plays were written by Francis Bacon, Edmund Spenser, Walter Raleigh, and others in order to set forth a philosophy which they did not care to own publicly. Her mind became unhinged, and she returned to America, and d. at Hartford (Connecticut). Hawthorne recounted his friendship with her in a chapter of *Our Old Home* (1863), 'Recollections of a Gifted Woman.'

Bacon, Francis, Baron Verulam and Viscount St. Albans, commonly but inaccurately called Lord Bacon (1561-1628), lord chancellor and philosopher, was b. at York House in the Strand, London, Jan. 22. His father was Lord Keeper Nicholas B., who ranks high among Elizabethan statesmen, and who held the seals of office for 20 years. His mother was Ann, second daughter of Sir Anthony Cooke, a well-educated woman and a zealous Calvinist. In 1573 Francis entered Trinity College, Cambridge, and in 1576 Gray's Inn.

It is said that while he was still at college he determined upon pursuing that course which should bring about the new philosophy. It is said that he himself regarded his profession as a means to this end. However, the death of his father in 1580 left him with comparatively little influence, and so he was dependent upon patronage. Henceforth his life

must be considered in 2 aspects: the political career and the literary, both so distinct and contradictory that, to a casual observer, it seems that Pope's saying is suitable to him, 'The wisest, brightest, meanest of mankind.'

After failing to obtain help from his uncle, Lord Burleigh, he was aided very considerably by the earl of Essex, whose unfortunate career in Ireland terminated too quickly to allow of his giving B. much further help.

Now occurs the period of which the most capital has been made by B.'s enemies. He had to manage the queen and Essex; he evidently did attempt to mediate honestly between them. But this having failed, what is certain is that he offered himself as counsel for the prosecution against Essex. He himself said in his *Apology* that he did so in the hope of helping his unfortunate patron. What was more generally believed was that he saw that he had gone too far, that he had offended the queen, that the fall of Essex meant his own ruin, and so he altered his plans accordingly. He made little attempt to save his friend. Moreover, when the queen wished to vindicate her action, it was B. who wrote *A Declaration of the Practices and Treasons attempted and committed by Robert, Earl of Essex*, and later apologised by saying that the maintenance of the State was more important than the ties of friendship. In the last years of Elizabeth's reign B. tried to act the part of mediator between queen and people. With the accession of James he found his chances of promotion increased. He was knighted on coronation day, and in the same year married Alice, daughter of Alderman Barnham. In 1604 he was made a king's counsel, and given a pension of £60 a year. In 1607 he became solicitor-general, and in 1612 attorney-general. He exerted himself to bring about the union of England and Scotland, and at the same time busied himself in writing. His servility during this period is usually illustrated from the cases of St. John and Peachment. (See PEACHAM'S CASE.) In 1616 B. was the prosecuting counsel in the Overbury murder case, and next year secured the dismissal of Coke, his rival, from the King's Bench. He next attached himself to the new favourite, Buckingham, who at first did his best by using his influence on behalf of B. In 1616 B. became a Privy Councillor, and in 1617 was appointed keeper of the Great Seal, and was raised to the peerage as Lord Verulam. The years in which he held office Macaulay declares among the darkest and most shameful in our hist. He allowed Buckingham to interfere in his decisions in the court of chancery, and at one time actually cancelled his judgment of a case and ordered it to be tried again in response to a peremptory letter from Buckingham. He acquiesced in the execution of Raleigh, and in the project of a Sp. marriage. A great deal of the maladministration of the time must be ascribed to the weakness of the king and the power of the favourites.



But it is impossible to exonerate the lord keeper. At this time the practice of granting monopolies as rewards was at its height. Patentees were armed with such great powers that they could override all law and order. But B., when he was asked to interfere, practically decided in favour of extending these powers. However, his fall was close at hand. The period of the Addled Parliament of 1614 had been succeeded by 7 years in which the nation was governed absolutely by the Crown. In 1621 want of money forced the king to convoke another parliament. If he and his ministers had understood the temper of the people it is possible that they would not have done so. Immediately Parliament assembled, the Commons proceeded in the most reasonable manner to discuss the granting of monopolies, under cover of which Buckingham and his friends had so oppressed and robbed the people. Buckingham began to fear for himself, and so proposed a plan by which certain people were to be sacrificed to the House to save others. Sir Giles Mompesson and Sir Francis Mitchell were first given over to impeachment. It was not long before B. understood that he, too, was to be abandoned. The Commons, led by B.'s enemy, Coke, appointed a committee to inquire into the state of the courts of justice. On Mar. 15, 1621, the chairman reported that great abuses had been discovered. 'The person,' said he, 'against whom these things are alleged is no less than the lord chancellor, a man so endued with all parts, both of nature and of art, that I will say no more of him, being not able to say enough.' There were 23 specific charges which were put before the Lords temperately enough. The evidence was so clear and irrefutable that the lord keeper's friends could only ask for suspension of judgment. B. himself seems to have realised the hopelessness of his position. He became ill, and from a letter written at the time he seems to have had no wish to recover. The inquiry was proceeding when the adjournment of Parliament gave him a short respite. On the reassembly of the Houses B. admitted practically everything, and renounced all defence. He was condemned to pay a fine of £40,000, and to be imprisoned during the king's pleasure. He was removed from his offices, declared incapable of holding any other, and banished from court. The sentence was undoubtedly severe, but probably none of the judges thought it would be carried out in its entirety. B. was indeed imprisoned in the Tower for 2 days as soon as his health improved, but at the beginning of 1624 he received a full pardon. The argument that such bribes and fees were the customary emoluments of the law officers of the day, and that therefore B. was simply used as a scapegoat, cannot be admitted for a moment if we consider B.'s own view of the matter. True, at first he denied all the allegations with great indignation. But later, when he found himself deserted by

his powerful friends, the king and the favourite, his attitude shows clearly his own condemnation of himself. Not once does he hint that presents are the same thing as fees. He never attempted to defend himself now, as he had done in the prosecution of Kissex. In his final 'confession and submission' he goes over all the charges, and, with the exception of a few unimportant denials, declares himself guilty: 'I do plainly and ingenuously confess that I am guilty of corruption, and do renounce all defence and put myself upon the grace and mercy of your lordships'; and again, at the end, when he had stated all he could in favour of himself, 'I do now again confess that, in the points charged upon me, though they should be taken as I have declared them, there is a great deal of corruption and neglect, for which I am heartily sorry, and submit myself to the judgment, grace, and mercy of this court. For extenuation I will use none concerning the matters themselves.' The most remarkable comment on his case and on the state of the courts in England is his own statement, made some years later: 'I was the justest judge that was in England these fifty years; but it was the justest judgment that hath been pronounced these two hundred years.' No judges could have been more favourable to him than those who tried him. He was spared all public humiliation as far as possible. After 1624 he was at full liberty to return to court, and even to take his seat in the Lords, had he desired to do so. He received a pension of £1200 from the Gov., and his magnificence was as great as ever. This carelessness in money matters may explain some of the passages in his confession; it is certain that it brought him into difficulties during the last years of his life. He was forced to sell York House, and to live at Gray's Inn while in London. Yet, during these years he rendered such services to letters that the world must regret the years that had been wasted, as Sir Thomas Bodley said, 'on such study as was not worthy of such a student.' In 1622 he completed his *History of King Henry VII.*, and in 1623 his *De Augmentis*, and in 1625 the best collection of jests in the world, *Apophthegms New and Old*. Sev. political tracts and valuable additions to what he had already written were the product of this part of his life. In 1626, while travelling in his coach near Highgate, he caught a chill while performing an experiment. He considered that excessive cold might serve to prevent animal tissues from putrefaction. On this particular day he alighted from his coach to stuff a fowl with snow in order to test his theory. Almost immediately he became ill and was taken to the earl of Arundel's house. Here he *d.* on Easter Day.

It is by the *Essays* that B. is best known to the general reader. First pub. in 1598, they appeared as 10 in number; later, as successive eds. were issued, they became more; in 1619 they were nearly 4 times as many, and in 1625, the last

ed. pub. during his lifetime, nearly 6 times as many. These *Essays* differ greatly from his later works. They are simply observations he had made, and rules he had found to be true, in his way through life, and are set down uncereemoniously. There is hardly any attempt after 'style'; in few is there any deliberate seeking after order. In 1598 they read almost like notes, and although they are recast later, the same ruggedness of outline remains. For what is considered his greater work he had a different manner of writing. As far as subject-matter, truth, and beauty are concerned he rarely surpassed the *Essays*, but his style was becoming constantly richer, softer, and more melodious. In 1605 he dedicated to the king *Two Books of the Proficiency and Advancement of Learning, Divine and Human*. In 1623 he expounded this into the Lat. treatise, in 9 books, entitled *De Augmentis Scientiarum*. In 1610 he gave to the world his *Wisdom of the Ancients (De Sapientia Veterum)*, a fanciful interpretation of old classical mythology, but none the less a brilliant piece of work. In 1620, just before his fall, appeared what is undoubtedly the greatest of his works, the 2 books of his *Novum Organum Scientiarum*, or new method of scientific discovery, in which he announced what he thought to be a previously unthought-of method of questioning nature, and extorting her secrets from her. This work was to be the second part of a great scheme, *Instauratio Magna*, or the Great Restoration, *De Augmentis* being the first, the whole to be completed in 6 books. In 1622 he pub. the *History of the Reign of King Henry VII.*, and as stated before, his marvellous industry continued to the end. Of these books, the *Advancement* must be considered as a call to a great cause. It is evidently a hurried production, and is not well arranged. Yet it is a work whose purpose was immense, whose influence is even now at work. It was the first of a long line of books, the purpose of which was to teach people the use of knowledge—how, why, and what to know. B. considered it merely a beginning; the *De Augmentis* was a development of it, and in his later Lat. works he sought to go farther in the road he pointed out first of all. In the *Novum Organum* he reverted to the form of aphorisms. He worked 12 years on this book, and carefully weighed every word. It developed into a war on the world of science as it was then; and declared that all knowledge must be begun again, by a new and, as he thought, infallible method. The first book simply prepares; in the second book, with the eleventh aphorism, he declares his own method. It is usually said, mistakenly, that he rediscovered the method of induction as opposed to that of deduction. The method of reasoning then in vogue had been to accumulate instances without following any rule of selection; that is, a theory was formed, and then was supposed to be proved if instances could be accumulated which agreed with the theory. H., on the other hand, pointed

out the advantages of the experimental method. Given an effect, work backwards to the cause or causes; experiment then to discover if the cause produces the effect. B. elaborated this method of exclusions, but, as Macaulay points out, it is ridiculous to say that he discovered the method of induction. Intrinsically, his method was valuable. He saw the force of causation and that the real object of science should be to find out causes. He has received much credit for this. The amazing discoveries of modern science are, not without reason perhaps, assigned to his awakening. But when we come to examine details we find that the most surprising divergence of opinion exists among competent judges. Some of his most ardent admirers have come to the conclusion that as an instrument and real method of work B.'s plan was a failure. B. claimed that his method was infallible and mechanical, and that it would reduce all minds to the same level in the task of obtaining knowledge. To have made such an assertion shows that he could never have understood the possibilities of the human mind. Again, his explanation of the science of induction is not clear enough to be satisfactory. His own conclusions are either unverified or merely negative. His conception of the meaning of philosophy was altogether too narrow, embracing as it did merely the natural sciences. Finally, his method was altogether too mechanical.

Yet with all this he has a pre-eminent place in the hist. of science. The principles on which he worked were the only true ones, and he propounded them systematically and earnestly. He showed that intelligent, patient examination of things was the only way to knowledge. He wished to make a new world, happier than the old in the possession and pursuit of knowing. He was keenly alive to the needs and pains of human life, and thought it no shame to use knowledge to alleviate them, in 'charity to man, and anxiety to relieve his sorrows and necessities . . . for this should men study to be perfect in.' Certain it is that his conclusions were often vague and untrue; that he himself did not know the immensity of what he aimed at; equally certain is it that he expressed in such terse, beautiful language what had broken in on other minds before that men were bound to answer the call and follow the gleam. Unfinished though his great scheme of the Restoration was, yet the *Novum Organum* was a worthy crown. He had intended much more, and there remains a vast amount of unused or neglected material which shows how it was thought out, arranged, and recast. It was written and rewritten 12 times over before its publication. Mr. Ellis says that the scheme for the *Instauratio Magna* was as follows: 'The first book contains a general survey of the present state of knowledge; in the second men are to be taught how to use their understanding; in the third all the phenomena of the universe are to be stored up . . .; in the fourth examples are to be

given of its operation . . . ; the fifth is to contain what B. had accomplished in natural philosophy *without* the aid of his method . . . ; the sixth will set forth . . . the results of the application of the new method to all the phenomena of the universe."

Doubtless, to the ordinary reader, the most interesting claim in regard to B. is that which assigns to him the authorship of Shakespeare's plays, together with that of many other works of the period. The war of Shakespearians v. Baconians has produced much writing and not a little acrimony. For years researches have been carried on in order to clear up the so-called mystery of Shakespeare. The arguments of the Baconians may be summed up briefly as follows: Francis B. was undoubtedly, if we exclude the author of Shakespeare's plays, the greatest mind of the Elizabethan epoch. To him alone, still assuming that William Shakespeare was not the true author, can be credited the production of those marvellous plays. Countless passages in them may be paralleled in his own writings. Moreover, the sonnets, the 'key with which Shakespeare unlocked his heart,' and which open to such a shadowy portal, are peculiarly applicable to B. But it is upon negative evidence that most stress is laid. We have only 5 specimens of the handwriting of Shakespeare, and taking the signature, which occurs in all, we see that it is by no means clear, and certainly not what we would call an educated hand. The evidence is far from being conclusive. Certain enthusiastic supporters of the Baconian theory pin their faith to ciphers obtained by poring over the first folio of Shakespeare's plays, pub. in 1623. Perhaps the most important of these believers are Sir Edward Durning Lawrence and Dr. Orville Owen. The latter, after 30 years' research, claimed to have discovered a cipher which would lead him to the discovery of MSS. which B. buried in the bed of the Wye. According to the cipher, he said that B. originally buried his treasure near Chepstow Castle; then later, fearing its discovery, removed it and placed it in an excavation in the mud of the Wye which he formed by diverting the course of the riv. by means of timbers. No measurements were given, but the place was indicated by means of a Rom. ford and a reference to a cleft in the cliff. During Easter week, 1911, Dr. Owen, assisted by the duke of Beaufort's workmen, discovered timbers which seemed to be between 200 and 350 years old, and which had not been part of a bridge. Later a type of cache was discovered, but then the work was discontinued. Dr. Owen's theory was that B. and Essex were the children of Elizabeth and Leicester, being the offspring of a marriage which took place in the Tower during Elizabeth's imprisonment there. At the age of 16 B. discovered this, and in a fit of anger the queen admitted it. Not daring publicly to resent his position, B. confided it to cipher writings,

and, inspired perhaps by the story of Philip of Macedon, who buried all his treasure near a ford in the R. Oxus, B. determined to do likewise. It is conjectured that the literary secrets revealed will be even more interesting. Not only will Shakespeare's plays be proved his, but much of the work now attributed to Robert Greene, Peele, Marlowe, Spenser, etc., will be also made known as his. The stupendous nature of this claim is dismissed by the Baconians with the assertion that even then it will not be equal in bulk to the work of Sir Walter Scott. *See also under SHAKESPEARE.*

Setting aside all these claims, even if B. is never proved to be Shakespeare, or Shakespeare B., it is enough that his already acknowledged work be accurately judged to place him in the front rank of the geniuses of the world. In one sphere alone, if it is granted that Macaulay's words are true, he 'moved the intellects that moved the world.' B. has a prominent place in the evolution of our law. But, apart from his strong tendency to permit politics to interfere with legal administration through the office of the chancellor, his academic conception of law was so wide that it touched, on the one hand, on the philosophy of things, and, on the other, the comparative institutions of nations. In important cases, to use his own words, he 'always used extraordinary diligence,' as may be gathered from his arguments as solicitor-general in the famous case of the *Post-Nati* of Scotland (1607) (the case which decided that those Scotchmen who were born after the union of England with Scotland under one king (*postnati*) were not aliens); and also in the case of the *de non procedendo Rege inconsulto*, 1616 (the case in which the king's right of appointment to office was involved). It may be said that B. foresaw in his decisions as chancellor the necessary evolution of the whole body of equitable jurisdiction. In his own words, it was the province of equity to 'supply the defects of the common law'—though to-day we should limit that function to proper cases only. As chancellor, B. aspired to the part of an overseer over the judges, but in his conflict with Coke he failed to obtain from the judges any recognition of the position which he so claimed for the court of chancery.

*Consult Reports of Cases decided by Francis Bacon, Baron Verulam, Viscount St. Albans, Lord Chancellor of England in the High Court of Chancery (1617-21), prepared from the records of that court by J. Ritchie, 1932.*

**Bacon, Henry** (1866-1924), Amer. architect, was born at Watseka, Illinois, and studied architecture at Illinois Univ. From 1888 to 1891 he gained experience working with sev. firms, but from then until his death in 1924 he practised independently. Among the notable buildings he designed were the Union Square Savings Bank, New York, Public Library, Patterson, New Jersey, and the Whittemore Memorial Bridge, Naugatuck, Connecticut. He also designed

monuments such as the Civil War and World War monuments, Yale Univ., and the Farnell monument in Dublin. The Lincoln Memorial, erected at Washington 1920, was also his work.

**Bacon, John** (1740-99), Eng. sculptor. Trained as a modeller and painter on porcelain. In 1769 a bas-relief representing the flight of Aeneas from Troy won for him the first gold medal ever awarded by the Royal Academy for sculpture. In 1770 he exhibited a figure of Mars, and in consequence received the gold medal of the Society of Arts and was elected an associate of the Royal Academy. His rivals accused him of ignorance of classic style, and to repudiate the charge he executed a head of Jupiter Tonans. The best known of his works are the monuments of Pitt in Westminster Abbey and the Guildhall, of Dr. Johnson and Howard in St. Paul's Cathedral, and of Blackstone in All Souls', Oxford. He was buried in Whitefield's Tabernacle.

**Bacon, Leonard** (1802-81), Amer. Congregational minister, editor and author, called 'the Congregational Pope of New England'; b. at Detroit, Michigan. Graduated at Yale Univ., 1820, and Andover Theological Seminary, 1823. In 1825 became pastor of the First Church, New Haven, with which he was connected till his death. Ed. the *Christian Spectator*, 1828-38. He was prof. of didactic theology at Yale Univ.

**Bacon, Nathaniel** (1593-1660), Puritan lawyer. Member of the Long Parliament, 1645-60. Wrote *A Historical Discourse of the Uniformity of the Government of England* (1647-51).

**Bacon, Nathaniel** (1642-76), b. in England, but emigrated to Virginia, where he became a member of the governor's council. Headed an expedition against the Indians, in defiance of Governor Berkeley's policy. Was proclaimed a rebel, captured, tried, and acquitted. B. and his supporters demanded a reduction of taxes and an extension of the suffrage. Being for a second time proclaimed rebels, they marched on Jamestown, which they captured and destroyed, but B. d. before he could carry out any of his reforms.

**Bacon, Sir Nicholas** (1509-79), Eng. statesman, father of Francis B. by his second wife Anne, daughter of Sir Anthony Cooke. He graduated at Corpus Christi College, Cambridge, in 1527, after which he entered Gray's Inn and was called to the Bar, 1533. In 1537 he became solicitor of the court of augmentations; 1546 attorney of the court of wards and liveries; 1550 he became a bench, and in 1552 treasurer of Gray's Inn. After the dissolution of the monasteries, 1539, he received a large share of the forfeited estates from Henry VIII. During Mary's reign, his Protestantism cost him many of his emoluments, though he retained his office in the court of wards. On the accession of Elizabeth, 1558, he became a Privy Councillor and keeper of the great seal. In 1559 he was knighted and was allowed to exercise full jurisdiction of lord chancellor.

He and his brother-in-law, Cecil (afterwards Lord Burleigh), had the ordering of eccles. matters. He had a keen political hatred for Mary Queen of Scots. Founded a free grammar school at Redgrave. Buried in St. Paul's Cathedral.

**Bacon, Sir Reginald Hugh Spencer** (b. 1863), Brit. admiral; educated, H.M.S. *Britannia*. In 1897 appointed commander of H.M.S. *Theseus*. Started the submarine boat service in the Royal Navy, and was naval assistant to the first sea lord of the admiralty in 1905. Captain of H.M.S. *Dreadnought* during her first commission: director of naval ordnances and torpedoes, 1907-9. Retired 1909 and became managing director of the Coventry Ordnance Works. When the First World War broke out he commanded the Heavy Howitzer Brigade, Royal Marine Artillery, with the B.E.F. (q.v.) in France. Rendered great service in command of the Dover Patrol (q.v.) from 1915 to 1918. In 1918-19 he was controller of the munitions inventions dept. at the Admiralty. Pub.: *Benin, the City of Blood* (he was chief of intelligence service in the Benin expedition of 1897); *The Dover Patrol*, 1919; *The Jutland Scandal*, 1925; *A Naval Scrap Book*, 1925; *The Life of Lord Fisher of Kilverstone*, 1929; *The Concise Story of the Dover Patrol*, 1932; *The Life of John Rushworth, Earl Jellicoe*, 1936; *Modern Naval Strategy* (with F. E. McMurtrie), 1940.

**Bacon, Robert** (d. 1248), the first Dominican writer in England, the brother, or, according to some authorities, uncle of Roger B. He was educated at Oxford and Paris, joined the order of the Dominicans, and (possibly) succeeded Edmund Rich as treasurer of Salisbury Cathedral in 1233. He rebuked Henry III. for his fondness of foreign advisers, notably Peter des Roches. He wrote a life of Edmund Rich, *Liber in sententias Petri Lombardi, Sectiones Ordinariae*, and other works.

**Bacon, Roger** (c. 1214-94), an early Eng. philosopher and scientist, author of numerous treatises; b. near Ilchester, Somerset. Educated at Oxford, where he took orders in 1233. Went to Paris for study and returned about 1250, when possibly he joined the Franciscan order. His learning won for him the title of Doctor Admirabilis. His brother friars were jealous of his ability, and his research in physics and chem. caused him to be suspected of dealings in the black arts and gave rise to doubts as to his orthodoxy.

In 1257 his lectures at Oxford were interdicted, and he was imprisoned in Paris. During his confinement he was requested to send to Rome a copy of his work, which the Pope, Clement IV., had been forbidden to read at the time when he was Guy de Foulques, papal legate in England. B. accordingly wrote his *Opus Majus*, which he followed up in 1266 with *Opus Minus* and *Opus Tertium*. It is not known what Clement thought of them, but at any rate B.'s release was

effected, and in 1268 he was back in England. Ten years later his works were again condemned as heretical, and his second imprisonment, which lasted 14 years, was sanctioned by Pope Nicholas III. During this term of imprisonment he wrote many treatises, including *De Retardandis Senectutis Accidentibus*. He was released in 1292.

B.'s fame has increased of late years. The *Opus Majus* is a storehouse of information. In it he showed up the vices of the theology of his time, expounded the necessity of reformation in the sciences by a careful study of nature, and descanted generally on alchemy and other sciences. B. discovered errors in the existing calendar, and his rectified calendar may be seen at Oxford. He had a practical knowledge of chemicals in advance of his age, but he shared in certain popular beliefs with regard to alchemy, the philosopher's stone, and the doctrine of signatures.

**Bacon Beetle** (*Dermestes lardarius*), a destructive species of beetle, which attacks bacon, dried foods, and stuffed collections. The insect is small and black, with the exception of the root end of the wing, which is golden-brown and dotted with 3 dark spots.

**Bacon-Shakespeare Controversy**, see BACON, FRANCIS.

**Baconthorpe**, Bacon, or Baco, John (d. 1346), an Eng. schoolman and philosopher, called the Resolute Doctor; the grandnephew of Roger B. He entered a Carmelite monastery near Walsingham, graduated at the univ. of Paris; became the head of his order in England, 1329-33. In 1333 he went to Rome, and returned to England in 1346. He preached the doctrines of the Arabian philosopher Averroes (q.v.) and wrote commentaries on the Bible and numerous treatises, including *Commentaria super Quatuor Libros Sententiarum*, Paris, 1484. Consult Aymers (Turin, 1687-69), and Zagalia (Ferrara and Parma, 1696-1706).

**Bács**, or **Bács-Bodrog**, formerly a co. of S. Hungary, being a plain lying between the Danube and Theiss, which rivs. are joined by the Bács or Franzens canal, constructed between the years 1796 and 1802. In 1920 the greater part was allotted to Yugoslavia; the remainder has a pop. of 115,220 of whom 28 per cent are Gers. Wheat, maize, and fruit are produced and horses bred. The cap. is Baja (q.v.).

**Bacsanyi, János** (1763-1845), Hungarian poet. His first pub. work was *The Valour of the Magyars*, a poem. He ed. the *Magyar Museum*, which was suppressed by the Gov. as advocating dangerous liberalism. He was implicated in the conspiracy of Bishop Martinovitch, and underwent imprisonment. During the remainder of his life he suffered persecution.

**Bacteria** are microscopic organisms which have no chlorophyll and consequently most of them are unable to synthesise their body substance (protoplasm) from simple inorganic materials. A few, however, such as the iron and

sulphur and nitrifying B. mentioned below, are able to build up protoplasm from carbon dioxide and salts by the process of chemosynthesis, allied to photosynthesis of green plants but taking place in the absence of light. In many respects B. closely resemble the fungi, and so are sometimes grouped as Schizomycetes, on account of their reproduction by fission (Gk. *σχίζειν*, to cleave; *μύκης*, fungus). It is, however, preferable to regard B. as a distinctive group of very simple living organisms which have not yet evolved into either plants or animals, and which may resemble the primitive forms of life first produced on the earth. The names bacilli, microbes, micrococci, microorganisms, and germs are also popularly applied to the group as a whole. Their multiplication is so rapid that they may produce more than 16,000,000 in a day, and they are so minute that about 2500 of some of the larger forms, placed end to end, would measure about one-tenth of an in. Others cannot be seen even under the highest magnification of the microscope, and their presence is detected, or rather deduced, only from their effect on other organisms in which they cause some of the most virulent diseases. Such ultra-microscopic forms are known as the filterable viruses, because they pass through the pores of a porcelain filter. If the pores be fine enough, the virus may be separated from the microscopic B.

**Classification.**—The classification of B. is unsatisfactory, because the main diagnostic feature on which it was originally based was that of the shape of the cell. This method has been in use so long, and has consequently collected so much nomenclature founded on this feature, that there are obvious disadvantages to the medical profession in replacing it by a newer system of terminology. Moreover, the ready recognition of external form is of great importance in clinical work. Such a system of classification is, however, not really scientific, and the Society of Amer. Bacteriologists has suggested a system comparable to that of the higher plants.

The classification at present still in use in Great Britain divides B. into higher and lower forms. The latter, or Eubacteriales are far more numerous, and include motile and non-motile unicellular organisms, consisting of a mass of protoplasm within an investment. Spores may be formed within the cells, and such spores are called endospores. Eubacteria are of 4 main types, and are classified according to their shape as:

(1) **Cocci**. These are spherical organisms reproducing by fission, but various members of the group divide in different ways, and so sub-divs., dependent on the mode of fission, have been formed.

(a) In *Sarcinococci* (Gk. *σπέρμα*, twisted) occur in only 1 plane, and the cells are held together in a row by their gelatinous investments.

(b) In *Staphylococci* (Gk. *σταφυλή*, a bunch of grapes) divs. may occur in any

plane, and so will result in the formation of an irregular mass of cells.

(c) *Micrococci* in fission form groups of 4 or multiples of 4 by div. in 2 planes at right angles. Two of these cells, remaining in contact after the separation of the groups, are described as a diplococcus, e.g. the *Gonococcus* and *Pneumococcus*.

(d) *Sarcinae* divide in 3 planes, 2 longitudinal and 1 meridional, at right angles to one another, and so form groups of 8.

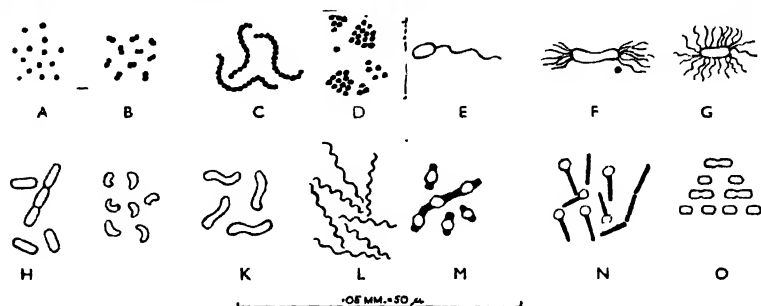
(2) *Bacilli* are rod-like B. which are really cylindrical. The main axis of the cylinder may be relatively long or short, and the ends may be flat or convex, so that under the microscope the bacillus

with a narrow fixing base. They are mainly aquatic, and their envelope frequently contains iron oxide. Such forms are popularly described as 'iron B.'

2. *Streptothrices* are branched aseptate filaments which may produce special reproductive branches from which chains of rounded conidia are formed, or the filament may reproduce by dividing transversely into a number of rods.

3. *Thiobacteria* or 'sulphur B.' contain sulphur and sometimes bacterio-purpurin. A sheath is not always present, and the organisms may be free or attached. The free forms move by protoplasmic contraction.

The Amer. classification divides the B. into the six orders: 1. Eubacteriales;



BACTERIA

A, cocci; B, diplococci; C, streptococci; D, staphylococci; E, monotrichous flagella; F, amphitrichous flagella; G, peritrichous flagella; H, bacilli; I, vibrios; K, spirilla; L, spirochaetes; M, anthrax spores; N, tetanus spores; O, division of a bacterium.

looks like a rod with square or rounded ends. It may have flagella at one or both ends, or all round the body, or flagella may be absent.

(3) *Spirilla* are curved, rod-like forms. The curves may be undulatory or spiral; at each end of the motile forms are from 1 to 20 flagella.

(4) *Spirochaetes* are non-flagellate, motile, spiral, or undulatory cells, usually comparatively long and thin. Various types of movement are effected by the contraction of the cell, and in some forms one end tapers so considerably that it is comparable to a flagellum.

The higher B. consist of branched or unbranched septate or aseptate filaments often invested with a gelatinous sheath. The units of these filaments resemble separate B., but the filament must be regarded as a simple colonial aggregate, for the units are interdependent and have sometimes a very special function. The unit at one end often fixes the organism, while that at the free end divides, abstracting spores called conidia, which can reproduce the bacterium immediately if conditions be favourable. The 3 chief orders of this group are:

1. *Chlamydo- or Tricho-bacteria*. These are unbranched, filamentous forms, often

2. *Spirochaetales*; 3. *Chlamydobacteriales*; 4. *Thiobacteriales*; 5. *Actinomycetales*; and 6. *Myxobacteriales* (see *General Systematic Bacteriology*, Buchanan). In this classification, B. producing diseases in human beings belong to orders 1, 2, and 5.

*Structure*.—Examined under the microscope, B. are seen as minute and transparent cells, usually colourless, and consisting of a mass of protoplasm surrounded by a definite wall which is different in character from the cellulose wall of higher plants. Around this wall many B. have a gelatinous covering, which enables them to cohere and form a slimy mass such as may be found on the surface of stagnant water and round flower-stalks which have begun to rot. This cohesive mass is the zoogloea (i.e. 'animal glue'). Some B. are coloured, but since the majority are not, their structure can be determined only with the aid of appropriate stains, usually aniline dyes. The presence of a differentiated nucleus has not been satisfactorily demonstrated, even in the larger forms, and from results so far obtained it seems unlikely that the cell contains an organised nucleus. The cells may contain food reserves of fat, carbohydrate such as glycogen, and of other materials.

**Growth and Reproduction.**—Under favourable conditions a bacterium grows very rapidly, and divides either transversely or longitudinally or in both directions. The new cells grow and divide almost immediately. When conditions become adverse, thick-walled resting spores, endospores, are formed inside the cell, and may rest and remain viable for months, or even years, awaiting the return of favourable conditions. Most B. are not killed unless they are subjected to extreme conditions.

**Food and Feeding.**—On account of the inability of all except the chemosynthetic species to synthesise food from carbon dioxide, water, and mineral salts, B. have to live on food manufactured by green plants. In a few cases they do this directly by living within or on parts of the plant. For example, some species live on seeds, and in feeding help to rot the testa and so help the seedling to grow out more easily. Most, however, do it indirectly by living in or on animals and on decaying plant or animal matter. In fact, the B. themselves effect the decay by the chemical decomposition due to their methods of feeding. These B. are either saprophytes (i.e. *sapros*, decay), or parasites, but many of the parasites cause the death of their 'host' or are expelled, and then go on living as saprophytes. To effect decomposition the B. secrete enzymes or ferments capable of decomposing such substances as cellulose, lignin, protein, and other compounds, and on this account are very useful to man (*see below*). On the other hand, some parasitic B., by decomposing blood and tissues, may cause great harm and even death. Some parasites are useful; those found in the intestine probably aid digestion.

The elements of food substances required by B. are practically the same as those needed by all plants—carbon, hydrogen, oxygen, phosphorus, sulphur, nitrogen associated with the metals calcium, potassium and magnesium. Some species need iron, and sodium compounds are present in many. It is difficult to discover in exactly what form B. require these compounds, because any one species of bacterium is rarely found alone. Usually there are associations of several species, and each may modify the substratum, while the others may be feeding on materials produced by the modification. Most B. prefer an alkaline medium; even a small amount of free acid will inhibit the growth of the cholera bacillus, and many B. are killed by the hydrochloric acid in the gastric juice of the stomach. By the method of culture it is possible to discover the foods which some B. can use.

**Methods and Uses of Culturing B.**—In any medium where B. flourish freely there is a confusion of different forms, spherical, cylindrical, and spiral. Some species use up all the available nourishment and die or dwindle into spores. Other species enter and multiply, and are in their turn destroyed through the exhaustion of the food supply or by the poisons created in the medium by other

species. The microbe pop. is thus always changing, and it is difficult to study their structure and actions unless each species can be separately collected. This may be done by sterilising a solution of agar-agar (obtained from a Jap. seaweed) to which has been added a food solution of materials similar to those on which the B. grow naturally. The sterilisation is carried out at a temp. which will not decompose the medium, and if it has to be as low as 57° C., sterilisation will take some days. If, however, it can be performed under pressure due to super-heated steam, from 20 to 30 min. will be long enough to kill any spores which have found their way into the medium. This is poured into sterilised flat dishes, Petri dishes, or into test-tubes sloped to expose a long slant surface of the agar. In the latter case the medium is usually sterilised in the tubes, which are plugged with cotton wool. If sufficient agar be used, the medium sets like a jelly, and is most convenient, because pieces on which B. are growing can easily be removed. Many other media are used for specific B.; the diphtheria bacillus grows on coagulated blood serum and the meningococcus on egg albumen. B. are scattered on the surface by adding a drop of water or liquid gelatine or by dipping a platinum needle into a mass of B. and quickly stroking it across the medium. If conditions be favourable, they divide, and the different types form separate colonies, which may be removed and sub-cultured separately on fresh media. In this way pure cultures may be obtained and subjected to experiments to determine the effect of changes in temp., light, food materials, poisons, and other factors. Such researches may be invaluable in determining the most favourable conditions of life for disease-producing B., the means of ending their activities, and also the best conditions for the activities of B. of economic value.

**Identification of B.**—Contrary to popular belief, it is not usually possible to identify B. by the use of the microscope alone, though examination of stained preparations is, of course, employed; living B. can be viewed by dark ground illumination, and this method is particularly useful for recognising Spirochaetes.

A most important aid to identification is the manner of growth of B. in the pure cultures prepared as described above, and observed with the naked eye. The size, colour, shape, type of surface, and other similar features are all used. Further important methods of identification are: (1) whether gelatine, used instead of agar-agar in the culture medium, is liquefied by the bacterium; (2) whether indole, a substance which can easily be tested for by chemical means, is formed; (3) whether various sugars are fermented by the bacterium, with production of acids, as shown by the colour change of an indicator incorporated in the medium; (4) whether in (3) a gas is formed as a result of the fermentation.

**Effect of Temperature.**—Every organism

has a temp. which is most favourable to its growth. Above or below this optimum temp. growth decreases until the limits beyond which it cannot take place are reached. These vary considerably, so that while for most B. the lower limit is about 12° C. and the upper about 40° C., a few will grow at 5° C., while those which decompose hay and dung grow well at about 60° C. Beyond the temp. limits endospores are frequently formed, so that though meat may be preserved in a refrigerator and milk by boiling, in neither case is it safe to assume that the B. are killed. Their activities, ended for a time, may be resumed if the endospores have survived and are given suitable conditions. Some B. have been found to survive temps. required to liquefy hydrogen, while the sulphur B. flourish in hot springs at a temp. of 77° C.

**Effect of Light.**—As a rule, B. are destroyed in a short time by bright sunlight, and in any case develop more rapidly in the total absence of light. It has been found that the ultra-violet rays are most efficient in bactericidal action, and the electric arc, which is particularly rich in blue-violet and ultra-violet rays, has been used with some success in the treatment of lupus (tuberculosis of the skin) by the Finsen lamp.

The action of the rays is limited, however, to the superficial tissues of the body; B. which are more than a centimetre from the surface remain unaffected. Increasing use of ultra-violet rays is being made in bacterial infections of skin, nose, and throat, and investigations on their effect on other glandular structures are proceeding.

**Phosphorescence.**—On a dark night luminous gleams may be seen on the surface of the sea. These are usually caused by protozoa, such as *Noctiluca*, but may also be due to B. living on organisms on the surface of the water or on fish. Other forms of phosphorescent B. are found on dead fish, putrefying meat, decaying wood and vegetables. The exact cause of phosphorescence is unknown, but oxygen is essential for its appearance. If phosphorescent material be put in an atmosphere devoid of oxygen, the light vanishes. Phosphorescence seems therefore to be the direct or indirect result of an oxidation process.

**B. and Oxygen.**—Whereas most living organisms can exist for a very limited time without free oxygen some B. can live only in the absence of this gas. The bacilli causing tetanus (lockjaw), botulism (*g.v.*) ('meat-poisoning'), and gas gangrene, a disease prevalent among the troops in the First World War, all flourish in the absence of oxygen, and are consequently termed anaerobes. They are found in the active state only in situations where free oxygen is absent, *e.g.* deep wounds (lockjaw and gas gangrene) or tinned food (botulism), and are destroyed by hydrogen peroxide, which readily liberates oxygen. Other B., aerobes, are unable to live unless oxygen be present, and to this type belongs the bacillus (*B. subtilis*) which is found in an infusion of

hay. Many of the disease-producing B. are able to live equally well with or without oxygen.

**B. and Nitrogen.**—Among the most important phenomena associated with bacterial action is the way in which the nitrogen of the atmosphere is rendered available for the use of animals and plants. The higher plants are unable to use atmospheric nitrogen until it has first been converted into nitrates by the agency of bacteria. Leguminous plants, such as clover, peas, beans, etc., are so well served in this respect by particular B. that they actually leave the soil richer in nitrogen than when they were sown. The bacterium lives in the root of the plant, and its presence is indicated by the appearance of nodules or tubercles upon the roots. Plants which are affected by this bacterium grow more vigorously than plants grown in sterilised soil and free from nodules. Leguminous plants are therefore an important item in the rotation of crops, and artificial cultures of the B. concerned are prepared so that the plants may be as fully infected as possible and so be able to gain the greatest amount of nitrogen compounds. The bacterium is able to effect the conversion of the nitrogen into ammonium compounds, and then into nitrites and nitrates, which the plant may build into proteins. When the leguminous crops are cut, the roots decay and the nitrate and protein pass into the soil. Here another group of B. decompose the proteins, breaking them down into ammonium compounds and sometimes liberating free nitrogen. Some nitrifying B. live in the soil and can carry on the rebuilding process of ammonium compounds into nitrates available for the higher plants. Other nitrifying B. in the soil can build up the free nitrogen into the ammonium compounds. By the activities of these nitrifying and denitrifying B. the amount of nitrogen in the atmosphere is kept approximately constant, and depletion of nitrogen in any one form is prevented. The circulation is known as the nitrogen cycle.

**B. in Industry.**—Owing to their power of secreting ferments, B. are of great economic importance. The separation of the fibres of flax is effected by the decomposing action of the B. on the tissues connecting the fibres. Those of jute and hemp are separated in a similar way. B. also play a part in the curing of tobacco, the manuf. of vinegar from wine, the decomposition of dung for use as manure, leather tanning, and in the preparation of cream for butter. A bacterium known as *Clostridium* is now employed in the commercial production of acetone and butyl alcohol. Citric acid (for fruit drinks) is formed by a mould, alcohol and glycerine by yeast; both these organisms are closely related to B. Ginger beer is obtained by fermenting sugar with a yeast and a bacterium living in symbiosis. Sour milk may be produced by the action of many different bacilli; one of the best known of these is the lactic acid bacillus which during the



fermentation produces the acid from which it is named.

**B. and Disease.**—It had long been suspected that suppuration was due to the presence of organisms in wounds. For instance, Semmelweis of Vienna had shown the value of washing the hands in chloride of lime as a means of preventing the spread of puerperal fever. Joseph (afterwards Lord) Lister realised the importance of Pasteur's work on microbes as agents of fermentation, and showed (1867) that suppuration was likewise due to micro-organisms (in this case *B.*) and could be avoided by killing the germs with antiseptics such as carbolic acid. Finally, Robert Koch isolated and cultured the bacterium which causes anthrax; similar work on other diseases quickly followed. The more superficial diseases due to *B.* entering wounds are caused by small spherical *B.*, *Streptococcus pyogenes* and *Staphylococcus aureus*. They are constantly present where people are gathered together, especially in sick wards of hospitals and other places where there are persons affected with suppurative inflammation. Child-bed fever is caused by the same organisms, and undoubtedly many cases were occasioned by doctors and nurses carrying infection before the origin of the disease was known. The danger has been considerably lessened by the precautions taken to sterilise the hands and instruments used in child-birth and by the gradual improvement in the standard of efficiency and general intelligence of midwives.

*Streptococcus pyogenes* may produce degrees of irritation varying from local redness to erysipelas, while *Staphylococcus aureus* is associated chiefly with supuration. The *B.* infecting the deeper tissues of the wound are even more dangerous, and are those causing tetanus and gangrene. Their activities precede those of the pyogenic forms, and are stopped by the latter, which live partly on the products of decay of their predecessors.

The formation of pus when wounds are infected by these *B.* is due to the action of the *leucocytes*, or white corpuscles of the blood. They are single cells which in ordinary circumstances circulate with the blood-stream, but are capable of penetrating the walls of the blood-vessels into spaces in the tissues. The work they do is the engulfing and digesting of small particles of waste or foreign substances, and they thus serve as scavengers to the blood. When *B.* enter a wound the corpuscles make their way to the part affected. Here they proceed to ingest the *B.*, but if these multiply more rapidly than the leucocytes can ingest them, they may penetrate to other parts of the body and cause abscesses. If, however, the leucocytes can cope with the bacterial invasions, they help in forming new tissue to heal the wound, from which the dead corpuscles and *B.* are discharged as a yellowish-white mass known as pus.

Many of the pathogenic or disease-producing *B.* produce substances called

toxins in the tissues or in the blood, but in other cases, e.g. anthrax, a toxin is not formed, and the disease is caused merely by the presence of *B.* in large numbers. If these toxins circulate in the blood-stream a general effect known as toxæmia is caused. The *B.* themselves in this case are incapable of invading other tissues, and remain localised as in tetanus. In other cases the *B.* themselves, as well as their toxins, circulate and multiply in the blood so spreading infection throughout the body and producing the conditions of septicæmia (blood poisoning).

**Bacterial Diseases of Economic Importance.** **Cholera.**—For many years cholera has caused considerable mortality in tropical and sub-tropical countries where sanitation is bad, but the bacterium (*Vibrio cholerae*) was first isolated by Koch in 1883. It is often called the comma bacillus on account of its curved shape. It is usually taken into the body in contaminated water, and is able to move rapidly by vibrating a terminal flagellum. Although it may spread to other organs, it lives chiefly in the intestine. The onset of the disease is very rapid, and recovery, when it occurs, is equally rapid. While investigating the habits of the cholera bacillus a number of research workers have discovered contracting the disease. Its cure is still very uncertain, but cholera may be prevented, and even modified in intensity, by inoculation. This treatment was discovered and first used in India by Haffkine (1895), and it has subsequently been used during wars to protect troops from the disease.

**Influenza** is a term loosely applied to similar conditions of feverishness and catarrh due to very different causes. From time to time, however, there have been widespread and devastating epidemics of such conditions, and the epidemic disease is described as epidemic influenza, to distinguish it from isolated non-epidemic cases. Epidemic influenza spreads rapidly and dies out rapidly, but often spreads so widely that it is best described as pandemic. After the pandemic outbreak of 1889-92, 2 independent investigators, Pfeiffer and Kitasato, discovered what they believed to be the influenza bacillus in bronchial sputum, while a third observer, Canon, recorded it in the blood.

Further investigations carried on after the pandemic outbreak of 1918 revealed the presence of a filterable virus associated with the disease. This virus, discovered by Obitsky and Gates, 1921, has been confirmed by more recent workers. There is no satisfactory evidence that Pfeiffer's influenza bacillus is the cause of the disease, though frequently associated with it, and particularly with the catarrh which often accompanies influenza. Inoculation with vaccines of different germs has in many cases helped to prevent influenza or to reduce its intensity.

**Leprosy** is caused by a bacterium, *Bacillus lepræ*, the disease exists in 2 different forms, one attacking the skin and the other the nervous system. It is treated with chaulmoogra oil, though

not very successfully. Better results have recently been obtained with extracts containing the essential principle of the oil and also with sulphur drugs. Transmission is by actual contact with an infected individual, e.g. during sexual intercourse.

**Plague.**—Both bubonic and pneumonic forms are due to bacilli. The devastating Manchurian epidemic of 1911 was caused by direct infection through inhalation of the pneumonic bacilli. The bubonic bacillus is usually carried by rat fleas, which are also parasitic on man. Bubonic plague was the epidemic which decimated London in 1665.

**Relapsing fever** is very common in the Mediterranean basin, and is produced by *Spirochaeta obermeieri*, which is introduced into the body by lice or ticks. The disease also occurs in Asia and America, and receives its name because the fever reaches a maximum, after which the temperature becomes normal; a few days or a week later another rapid rise in temperature occurs, lasting a shorter time than the first attack, and disappearing rapidly. A third relapse may occur in a similar way. In Asia the death-rate from this disease is very high. The *Spirochaeta* is a slender, fine, spiral organism with tapering ends. It can move quickly and multiplies rapidly in the blood and in the organs for a few days. Then, owing to the action of the leucocytes, it disappears gradually. The few remaining organisms multiply, and so produce a second feverish attack. Inoculation with serum containing anti-toxin has proved beneficial.

**Syphilis.**—As far back as the fifteenth century there are records of a disease which, from the descriptions, doctors recognise as syphilis, and Paracelsus says that he treated it with mercury, with some success. The organism causing it was discovered in 1903 by Schaudinn and Hoffmann, and is regarded by some authorities as a Protozoan rather than a bacterium. Recent classifications, however, include it with the *Spirochaetae* and though its discoverers named it *S. pallida*, it is now called *Treponema pallidum*. It is able to remain quiescent for a time and then multiply more actively. Wassermann has devised a test that will show the presence of the disease even during the inactive period. Syphilis is highly infectious, and may eventually cause general paralysis and disintegration of the nervous system. It is now treated by organic arsenic preparations, salvarsan and neo-salvarsan; penicillin is also proving of great value.

**Tuberculosis** was shown by Koch in 1882 to be due to a non-motile bacillus which can survive for some weeks in drought, and in distilled water. Ejected in sputum, the bacilli may remain alive for 2 months or more. As the sputum dries up, particles bearing the organisms are blown about by the air, and may be inhaled or taken into the mouth on food. Fortunately the human body, when in good health, offers considerable resistance to the bacillus, but should this gain successful access to the tissues, the cells

will divide actively and form little swellings, or tubercles, round the infection. Sunlight destroys the B. in the superficial tissues, but cannot effect a cure of more deeply seated infections. A method of treatment which has met with some success is to deflate one lung if it be more badly infected than the other and so force it to rest for some time. Prolonged rest of an infected part enables the tissues in time to enclose the bacillus. Tuberculosis has decreased considerably since sanitation and conditions of housing and nutrition have improved, and better methods of treatment have been devised.

**Typhoid fever** is caused by motile bacilli which are considerably larger than those associated with tuberculosis. They enter the body with food or drink and multiply in the intestines, giving rise to toxins which, when carried to other parts of the body, produce the characteristic symptoms of the disease. The bacilli also invade other organs, and may be found in the spleen, liver, and even the lungs. The bacillus does not infect the lower animals, and the disease is communicated by the excreta of infected persons, so that the elimination of typhoid fever is intimately connected with the methods of sewage disposal. An important feature is that the bacilli sometimes become domesticated in the person who has recovered from the disease, and although no longer injurious to their host, are still capable of infecting other persons. In this way local epidemics of typhoid may be caused. Flies, too, may act as carriers, especially in countries where sanitation is bad. They may carry the bacilli on their bodies or in their digestive system. During feeding, the bacillus may be ejected on food when the fly secretes saliva.

During the South African war and the 2 World Wars, an anti-typhoid vaccine was injected to prevent the disease. Two other types of fever, paratyphoid fevers A and B, required separate specific injections, so that a triple vaccine (T.A.B.) is now used.

**Yellow Fever**, which causes considerable mortality in W. Africa, the W. Indies, and America, is caused by a filterable virus, which is transmitted through the agency of a certain mosquito, *Aedes aegypti*. Control of this mosquito has greatly reduced the incidence of the disease, and rendered possible the construction of the Panama canal.

**Other Bacterial Diseases.**—Diphtheria, tetanus, and pneumonia are well-known bacterial diseases. Others under investigation are meningitis, which occasionally becomes pandemic and which accompanies or follows pneumonia and may sometimes apparently be caused by the same bacterium. Of the 4 types of *Meningococcus* known, only 1 at present can be combated by an antitoxin serum. Encephalitis lethargica, sleepy sickness, is attributed to a filterable virus, and increasing numbers of cases are being recorded. The disease is nearly always fatal, and further research in its nature and cure is being made.

Filterable viruses are the cause of many other diseases, such as foot and mouth disease, distemper, psittacosis, infantile paralysis, smallpox, chicken-pox, typhus, and measles, as well as sev. diseases of plants.

**Immunity.**—Individuals and races vary in their susceptibility to bacterial disease, owing probably to some inherited constituents in the blood which render it favourable or otherwise to the development of B. Where individuals are found to be unaffected by injurious germs, they are said to enjoy natural or hereditary immunity. It is also possible to *acquire* immunity from a second attack of a disease by the changes induced in the body as a consequence of the first attack. When bacterial poisons are produced in the blood, the body-cells elaborate certain substances which unite with these toxins and render them harmless. A habit of forming such anti-toxins may be estab., with the result that on subsequent infection the body may already be in a condition to neutralise the effects of bacterial invasion. Thus people who recover from small-pox, measles, scarlet fever, and, to a certain extent, typhoid fever, are protected from further attacks for a considerable time. The anti-toxin is usually specific—that is, it is only effective against one particular disease—and considerable progress has been made in the artificial preparation of anti-toxins to aid the natural resisting power of the body in fighting certain diseases. For example, when a horse is inoculated with the poison produced by diphtheria bacilli, his cells are stimulated to bring forth the appropriate antitoxin. The treatment is continued with larger doses of the toxin as the horse increases his resisting power by production of antitoxin. He is then bled and the serum or clear fluid removed from the blood and used to inoculate diphtheria patients, thus enabling them to combat the disease with greater prospects of success. Similar treatment is applied in cases of tetanus and botulism. Since a serum already contains the antitoxins, the immunity given by it is described as passive. Active immunity is given by vaccines which stimulate the body to produce its own antitoxins. Vaccines are emulsions of living or dead germs, or toxoids, that is toxins which have been rendered innocuous by treatment with chemicals such as formaldehyde. The dead ones are usually obtained by heating the culture sufficiently; living ones are grown under such conditions that their vitality is impaired, so that when injected into the body they may readily be overcome by the leucocytes. The antitoxins formed usually remain in the body for some considerable time.

Both serums and vaccines may be used in prophylactic as well as in curative treatment. When the antitoxins disappear from the blood re-injection is necessary to preserve immunity. In vaccinations against smallpox (Jenner, 1798) the antitoxins probably persist throughout life, though not in sufficient

quantity to prevent an attack, but they probably never lose their power to modify it. For prevention, revaccination is necessary from time to time. The original anthrax vaccine (Pasteur 1880) was efficacious for only 1 year. Immunity for a longer period is given by the anti-anthrax sera now used. Jenner and Pasteur were the pioneers in vaccine treatment; epidemics and war conditions have stimulated research, with the result that various vaccines have been discovered and are prophylactic against influenza, typhoid and paratyphoid fevers, plague, dysentery, and cholera, while endeavours to use others as curatives are being made in the treatment of boils and of tuberculosis.

B. also stimulate the cells of the body to produce substances called *opsonins*, which render the B. more susceptible to attack by the leucocytes. Vaccines thus help in securing immunity by inducing the formation of opsonins.

**Bacteroids**, a name applied to the bacteria which form tubercles on the roots of leguminous plants, e.g. beans living in symbiotic relationship with the plant.

**Bactria**, part of anc. Persia, corresponding to modern Balkh in Afghanistan, bounded on the N. by Sogdiana, on the S. by Ariana. Its early hist. is mythological. Conquered by Cyrus c. 540 B.C., when it was made one of the satrapies of the Persian empire. It was conquered by Alexander, and became a prov. of the Macedonian empire under the rule of Seleucus. About 255 B.C. Diodotus, a satrap, asserted his independence and founded a Græco-Bactrian kingdom which extended as far as the Kabul and the Indus. During the sixth century A.D. it was subjugated by the Turks, and came under the rule of Islam. The cap., Bactra, or Zariaspa (modern Balkh), was the cradle of the Zoroastrian religion.

**Bactrian Coins** have been found in the 'topes' or burial-places to the N.E. of Kabul. The inscriptions are written in the B. alphabet, an offshoot of the Iranian alphabet. The same characters are found on rocks near Peshawar and Kathiawar, which had been inscribed in the third century by Asoka, a great Buddhist emperor, with sermons on his faith. Dr. Isaac Taylor discovered that the numerals in ordinary use are the actual symbols of Indo-B. letters found on the above-mentioned coins, e.g. 4 is the Indo-B. letter *ch*, *chatur* (cp. Lat. *quatuor*), 5 is *p*, *panchan* (cp. Gk. *πεντε*). This alphabet was probably introduced into India after the conquest of Darius, then brought to Spain by the Arabs in the twelfth century, whence it spread throughout Europe, and was adopted in place of the more clumsy Rom. figures.

**Bactris** (Gk. *βακτρον*, staff), a genus of Amer. palms of small size, with slender stems which are much used in making light but solid walking-sticks. *B. maraja* produces a small fruit of pleasant taste; *B. acanthocarpa*, a fibre used in making nets.

**Bactrites**, a genus of fossil Ammonitidae with a straight instead of a spiral shell. The genus is found in Silurian and Devonian strata.

**Baculites**, a genus of polythalamous cephalopods belonging to the family of fossil Ammonites. The shell is elongated, straight, and conical. The chambers are pierced by a marginal siphon. B. are found in Neocomian and Cretaceous formations. The best specimens are to be found in the baculite limestone of Normandy.

**Baeup**, a modern municipal bor. and mrkt. tn. of the Rossendale div. of E. Lancashire, England. Cotton-spinning and power-loom weaving are the chief industries. There are also dye-works, brass and iron foundries, coal-mines, and stone quarries in the dist. Pop. 20,600.

**Badagry**, a small state and tn. in Nigeria, Africa. It does a considerable trade in palm-oil.

**Badajoz**: 1. a frontier prov. of W. Spain, formed in 1833 from dists. taken from the prov. of Extremadura. Pop. 703,000; area 8451 sq. m. The country is watered by the R. Guadiana, and there are low ranges of hills. The climate varies between extremes of heat and cold. The rainfall is scanty. The prov. suffers through lack of water and means of communication. The Madrid-Lisbon railway passes through Villanueva de la Serena, Mérida, and Badajoz. Agriculture is neglected, but live-stock—acorn-fed swine, sheep, and goats—is reared. Lead and copper are found in small quantities. The important tns. are: B., the cap., 46,000; Almendralejo, 15,500; Don Benito, 23,000; Azuaga, 16,500; Villanueva de la Serena, 14,300; Mérida, 13,000. 2. The cap. of the Sp. prov. of the same name, situated on the l.b. of the Guadiana. The tn. is a natural fortress, built on a slight hill, which is crowned with the ruins of a Moorish castle. It is the Pax Augusta of the Romans. Later captured by the Moors, and in 1031 made the cap. of a small Moorish kingdom, when it was named Bax Augos, or Bathaljus. In 1168 held by the Portuguese, but retained its independence till 1229, when it was captured by Alfonso IX. As a key to Portugal it has been an important stronghold in times of war; 1660, besieged by the Portuguese; 1705, besieged by the allies in the war of the Sp. Succession. During the Peninsular war it was unsuccessfully attacked by the Fr. in 1808 and 1809, and finally surrendered to Marshal Soult, 1811. It was a scene of terrible slaughter when Wellington pillaged the city, 1812. The prin. industries are woollens, cotton, leather, pottery, soap, and there is a large trade in cattle. In the Sp. Civil war, 1936-39, the tn. was taken by storm, in Aug. 1936 by Franco's forces, after fierce hand-to-hand fighting. Pop. 46,000.

**Badakhshan**, a Moslem ter. N.E. of Afghanistan, part in the Tadzhikistan S.S.R., part in Afghanistan. It is 200 m. from E. to W. and 150 m. from N. to S. It is bounded on the S. by the

Hindu Kush Mts., and by the Amu Darya on the N. There are beautiful woods, fertile valleys, and much pasture land. Travellers speak with the highest praise of its orchards and flower gardens, its fruit and nightingales. It was visited by Marco Polo, 1272-73, and by Gen. Wood, 1837-38. The inhab. are Tajiks, an Aryan race, speaking Persian. They are Muslims. Cap. Farkabad. Iron, lapis-lazuli, and rubies are found. Many kinds of animals are to be found there, of which may be mentioned the yak, cattle, camels, wild sheep, wolves, foxes, jackals, bears, boars, and leopards. Originally belonged to the Gk. Bactria. From the thirteenth century onwards governed by the so-called descendants of Alexander the Great. In the eighteenth century it belonged to the empire of Nadir Shah. In the nineteenth century it was captured by the chiefs of the Kataghan Usbeqs of Kunduz, but in 1859, Mir-Jahanded Shah was reinstated, and agreed to pay tribute to Afghanistan. In 1873 England and Russia agreed upon a frontier between B. and Afghanistan. Pop. about 100,000.

**Badalocchio**, Sisto (c. 1581-c. 1650), surnamed Rosa, b. at Parma. An It. painter and engraver, pupil of Annibale Carracci, whom he and a co-disciple, Lanfranco, accompanied to Rome in 1606. His prin. engravings are the series known as Raphael's Bible, which were executed by him in conjunction with Lanfranco. On the death of Carracci, 1609, he went to Bologna, where he d. about 1650.

**Badalona**, a seaport in the prov. of Barcelona, Spain, 5 m. N. of Barcelona tn. The surrounding dist. is rich in fruit. The tn. has pop. 45,200, and ship-building, sugar-refineries, and glass-works.

**Bad Ems**, see Ems.

**Baden**, a state of the Ger. Reich (1945), lies between Alsace-Lorraine and Württemberg, and is separated from Switzerland by the Rhine. It is divided into 4 dists., Constance, Freiburg, Karlsruhe, and Mannheim. The country is mountainous. The Schwarzwald, or Black Forest, has a maximum altitude of 4903 ft. The Neckar highlands are lower; to the N. of them begins the Odenwald. To the S. are the wide plateaux of the Ger. Jura, drained by the Rhine and the Danube. The tribs. of the Rhine on the B. side are the Neckar, Murz, and Elz. The N.E. ters. are bounded by the Maine. There is one lake, Constance. The Rhine valley is very warm, and the soil rich and fertile. Fruit and vegetables of all kinds, grain, hemp, tobacco, and wines are produced. Cattle are reared, and the production of honey is important. Before the Second World War clocks and straw-plaiting were the chief industries, and the jewellery of Pforzheim was well known. Other manufs. were ribbons, cottons, brushes, paper, cigars, leather, rubber goods, machinery, mirrors, and chemicals. Limestone quarries are worked, and there are important clay and gravel pits. Coal, zinc, gypsum, salt, and soda are found. There are as many as 60 mineral springs. There is a Protestant univ. at Heidelberg and a Rom. Catholic

one at Freiburg. The early inhab. were Alemanni, who fell under the dominion of the Franks; 496, conquered by Clovis and christianised; 748, Pepin the Little abolished the dukedom of Alemanni. In the eleventh century Duke Berthold built the castle of Löhningen in Breisgau and started the house of Löhningen. His second son Hermann took the title of margrave, and became the ancestor of the still famous house of B. In 1715 Margrave Charles William built Karlsruhe. His grandson, Charles Frederick, succeeded in 1746; he favoured the policy of Napoleon, joined the confederation of the Rhine, and in consequence doubled his estates, and gained the title of elector and grand duke. In 1811 he was succeeded by his grandson, Louis Frederick, who seceded from the confederation of the Rhine and in 1815 joined the Ger. confederation. In 1830 Leopold succeeded his half-brother Ludwig, and his rule began with a contest between Liberals and reactionists, and unfortunately the influence of the Fr. revolution of 1830 led the democratic party to excesses. Matters were beginning to readjust themselves in 1846 through the dominance of Liberalism when the revolution of 1848 again aroused the opposing forces; and Hecker and Struve drove out the grand duke and estab. a republic. The latter was reinstated by the Prussians, July 1849. In 1866 B. joined Austria against Prussia, and, when peace was made in the following year, joined the N. Ger. confederation. 1870-71, fought in the Franco-Ger. war and became part of the restored Ger. empire. Although he was very popular, the grand duke was obliged to abdicate after the collapse of the Ger. empire. His successors in power thanked him publicly in the name of the people. The National Assembly of B. voted the new constitution on Mar. 21, 1919. Pop. 2,300,000. The chief tns. (with 1939 pop.) are Karlsruhe (cap.) 160,000; Mannheim, 278,000; Heidelberg, 82,000; but the first two were largely destroyed by bombing in the Second World War.

Baden, or Oberbaden, a watering-place in the Swiss canton of Aargau, on the l. b. of the Limmat. Famous for its sulphur baths (the Aque Helvetiae of the Romans), which reach a temp. of 117° F. From the fifteenth to the eighteenth century it was the seat of the Swiss diet. Pop. 9220, but visited yearly by 20,000 persons.

Baden-Baden, in the valley of the Oos, at the edge of the Black Forest, 8 m. from the Rhine. Before 1939 it was a famous resort of society people of all nationalities. The season lasted from May to Sept., and there was a brief winter season. The gaming tables were once famous, but were abolished in 1872. There are medicinal springs containing iron, magnesia, lime, and sulphur, and varying in temp. from 115° to 150° F. On the summit of the Schlossberg are the ruins of an old castle, destroyed by the Fr. in 1689. The 'new castle,' built 1479 and likewise destroyed in

1889, has been restored. There were some 50,000 to 70,000 visitors annually.

In the great devastation wrought in S.W. Germany by the Second World War B.-B. was 1 of the only 2 tns. (the other was Heidelberg) that survived, and both are nearly intact. During the war 42 of the many hotels of B.-B. were used as hospitals. At the end of the war the inhab. were still living comfortable and even prosperous lives, untouched by war.

The city was founded in the second century A.D. by Hadrian (Civitas Aurelia Aquensis). Rom. antiquities and the remains of a vapour bath and dungeons have been found. Pop. 30,000.

Baden-bei-Wien (B. near Vienna), a fashionable resort (pre-war) of Lower Austria, in the valley of the Wienerwald, 16½ m. by rail from Vienna. Known to the Romans as Aquæ Pannonicæ. Famous for sulphur springs, which were visited annually by over 50,000 persons. These springs vary in temp. from 79° to 104° F., and are recommended for gout, rheumatism, and all kinds of skin diseases. Pop. 22,200.

Badenoch, a dist. in the S.E. of Inverness-shire, Scotland, 45 m. in length and 19 m. in breadth. It is traversed by the Spey. Gneiss rock and granite are found.

Baden-Powell, Robert Stephenson Smyth, Baron Baden-Powell of Gilwell (1857-1941), Eng. soldier, b. in London, Feb. 22, 1857, son of the Rev. Prof. Baden-Powell of Oxford. He had for godfather Robert Stephenson, son of the 'father of railways'; and his mother was descended from Capt. John Smith (1579-1631) of Virginian fame. Until he was nearly 12, he lived an outdoor life; then he went to a preparatory school, and in 1871 (with his younger brother) to the Charterhouse. He joined the 13th Hussars in 1876, with which he served in India, Afghanistan, and S. Africa. Assistant military secretary in S. Africa, 1887-89, in Malta, 1890-3; commander of the native levies in Ashanti, 1893; served with distinction in the Matabele campaign, 1896-97; raised to the command of the 5th Dragoon Guards, 1895. In the Boer war he won great popularity by his brilliant defence of Mafeking; in spite of famine and sickness, with a force of 1200 men he held the tn. for 215 days, till its relief on May 18, 1900. In recognition of his ability he was raised to the rank of major-general; inspector-general of the S. African constabulary, 1900; inspector-general of the cavalry, 1903-7. Always interested in boys and their welfare, he had written some years prior to his retirement from the Army in 1910 his *Aids to Scouting*, which was eagerly read by large numbers of boys. The first experimental camp of Boy Scouts on Brownsea Is., Poole Harbour, in 1907, was so successful that B.-P. decided on more extensive operations, which spread rapidly in Britain and other countries and eventually formed the world-wide Boy Scout organisation which has played a great part in the physical and moral development of youth in all countries. A

parallel organisation among girls—the Girl Guides—was founded in 1910. In the Boy Scout movement he was Chief Scout. He was knighted in 1909 and raised to the peerage in 1929. Exhibited sculpture in the Royal Academy, 1907. Lt.-Gen. commanding Northumbrian Territorial Div., 1908; retired, 1910; O.M., 1937. Died on Jan. 8, at his home in Kenya. Among his publications are: *Pig-sticking or Hog-hunting*, 1889 (revised ed., 1924); *Vedette*, 1890; *Cavalry Instruction*, 1895; *The Matabele Campaign*, 1896; *Sport in War*, 1900; *Scouting for Boys*, 1908; *Quick Training for War*, 1914; *My Adventures as a Spy*, 1915; *Indian Memories*, 1915; *The Wolf-Cubs' Handbook*, 1916; *Girl Guiding*, 1917; *Aids to Scoutmastership*, 1920; *Old Wolf's Favourites*, 1921; *What Scouts can do*, 1921; *Rovering to Success*, 1922; *Life's Songs*, 1927; *Scouting and Youth Movements*, 1929; *Lessons from the Varsity of Life*, 1933; *Adventuring to Manhood*, 1937. See E. E. Reynolds, *Baden-Powell*, 1942.

**Badenweiler**, a vil. of Baden, Germany, noted for its alkaline thermal springs. It is near the Black Forest, and 3 m. from Mülheim. It contains remains of Rom. springs. There were 10,200 visitors in 1926. Pop. 1100.

**Badge**, a device used as a distinctive emblem of families, countries, etc. It is a simpler and more primitive cognisance than the crest or coat-of-arms, and is not subject to the laws of heraldry. Bs., like crests and coats-of-arms, are usually symbolic in character, but on the one hand are distinct from the coat-of-arms as not being supported on a shield, and on the other hand are distinct from the crest as not surmounting a wreath. Famous Bs. are the *steur-de-lis* of the Fr. kings, which can be traced back to the reign of Louis VII. (1137–80), the Tudor rose, the thistle of Scotland, the harp and trefoil of Ireland, and the cross of Christianity. Bs. are also worn as signs of office, or as a token of membership of some society, e.g. Solomon's seal and the mason's tools used as an emblem by Freemasons, and the primrose used as a badge by members of the Primrose League. Bs. are used by savage peoples to identify their arms and mark their belongings. From the B. the more elaborate devices of heraldry were evolved.

**Badger** (*Meles*), a genus of burrowing carnivores, constituting with the skunks the sub-family Mephitidae in the Mustelidae, or weasel and otter family. Its chief characteristics are short, strong legs, long and more or less plantigrade feet, and a pointed muzzle. It has perineal glands, containing a substance emitting a fetid odour, which is thought to be of use in sex-attraction. The common B. (*M. taxus* or *M. vulgaris*) is found in the hilly and woody dists. of Europe and Asia, but is now comparatively rare in Great Britain. Its colour is greyish-brown, with a white head marked with black lines running from the nose to the back of the ears. It is about 2 ft. 6 in. long, and stands 1 ft. high. It is an inoffensive, solitary animal, sleeping by day in subterranean burrows

which it digs for itself, and wandering by night in search of its food, which consists of roots, insects, frogs, and the larvae of wasps and bees. The Amer. B. (*Taxidea americana*) is more carnivorous, and eats small animals such as marmots. Bs. are conspicuous for their shrewdness, perseverance, and courage. The cruel practice of B.-baiting, or drawing the B., was prohibited in England in 1850. A B. was kept in a barrel and attacked by dogs until it at last gave way and was dragged out. Then its owner released it from the dogs and put it back into the barrel to recover itself. This performance was continued during the day, and formed an attraction at public-houses of a low order. The verb 'to badger,' meaning to assail repeatedly, to worry, is derived from this practice.

**Badger, George Percy** (1815–88), an Arabic scholar, born at Chelmsford, Essex. His early life was spent at Malta and Beirut. He worked in the editorial dept. of the Church Missionary Society at Malta, and in 1841 entered that society's institution at Islington and became a priest. On account of his knowledge of the E. languages, he was sent out as delegate to the E. churches (1842–44 and 1850); gov. chaplain at Bombay, 1845; chaplain at Aden, 1846. He joined a Persian expedition under Sir James Outram, 1854–57. He was created D.C.L. by the archbishop of Canterbury in 1873. Author of *The Nestorians and their Rituals*, 2 vols., 1852; *An English-Arabic Lexicon*, 1881.

**Badger-baiting**, see BADGER.

**Badger State**, see WISCONSIN.

**Badghiz** (home of the winds), dist. in the N.W. of Afghanistan, bounded by the Murghab and Harirud Rs.

**Badia-y-Lablick, Domingo** (1766–1818), Sp. traveller, b. at Barcelona. He studied Arabic language and life, and he disguised himself as a Mussulman, calling himself Ali-Bel. His disguise was perfect, and he was invited to the court of the sultan of Morocco, where he was held in high esteem. Two years later he went on a pilgrimage to Mecca, and there performed all the rites. At Paris he pub. an account of his adventures under the title of *Voyage d'Ali-Bel en Afrique et en Asie*.

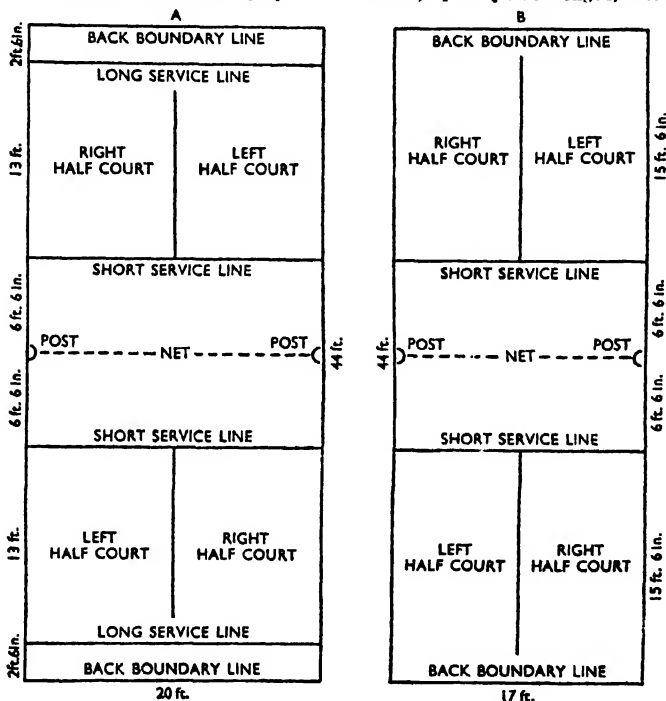
**Badistes** (Gk. *βαδιστῆς*, walker), genus of coleopterous insects of the family Carabidae. They inhabit marshy dists. of India and Madagascar; they are of small size and of a reddish, yellow, or black colour.

**Badius, Jodocus, or Jose** (1462–1535), Fr. printer, b. at Assche, near Brussels, and therefore sometimes called Ascensius. He studied at Ghent, Brussels, and Ferrara, and taught Gk. at Lyons and Paris. Treschel, a printer, engaged him as corrector of his press, and afterwards secured his services as a partner. In 1500 he settled in Paris and estab. a printing office that went by the name of Prelumi Ascensianum. He also wrote books, which include a life of Thomas à Kempis; *Sylva moralis contra vitia*; *Navicula stultarum mulierum*, a satire on the follies of women.

**Bad Lands**, great stretches of waste and rugged country in the W. of the U.S.A. Such regions are found in S. Dakota and Nebraska, on the White R., the Yellowstone, and the Little Missouri. Their chief interest is zoological, as they contain valuable fossil specimens.

**Badminton** is a game said to have been invented at B. House, the seat of the duke of Beaufort, in Gloucestershire. It is believed to have been much played in

The courts are laid out as shown in the diagrams and defined by white or black lines  $\frac{1}{4}$  in. in width. The net should be 5 ft. high in the centre, and 5 ft. 1 in. high at the posts. The court should be 44 ft. long; and 20 ft. wide for a double court and at least 17 ft. wide for a single court. The shuttles weigh from 75 to 85 grains, the average being about 79 or 80 grains. They consist of 16 goose feathers,  $2\frac{1}{2}$  to 2½ in. in length, inserted in



**BADMINTON COURTS**  
A, Doubles: B, Singles

India prior to its introduction into England in 1870. It is now very popular as an indoor game all over the Brit. Empire, and interest in it in the U.S.A. and on the continent of Europe has developed to such an extent that an International B. Federation was formed in 1934.

B. may be played both indoors and outdoors, but to-day it is played almost exclusively indoors on account of the effect of wind on the shuttlecocks which are used instead of balls. The game is really a development of the nursery game of battledore and shuttlecock, and is not unlike lawn tennis in character, except that all strokes must be taken on the volley, and the action is very much faster.

a cork base 1 to 1½ in. in diameter; the diameter of the circle formed by the feathers should be 2½ to 2¾ in. at the end of the feathers. The racket, though of no specified size or shape, usually weighs from 4 to 5½ oz., is 26 to 26½ in. in length, and similar to a tennis racket in shape.

The four-handed or double game is played with 2 players on each side. Choice of courts or service is decided by toss. The side winning a game shall always serv. first in the next game, but either of the winners may serve and either of the losers may receive the service first. The game consists of 15 aces. At 'thirteen all' the side reaching 13 first has the option of

'setting five,' and at 'fourteen all' of 'setting three,' or may elect to play only to 15. A match is the best of 3 games. The players change sides at the end of each game. If a third game is necessary the players also change when the leading side reaches 8.

It having been decided which side is to have the first service, the player in the right-hand half court on that side commences the game by serving to the player in the opposite right-hand half court (diagonally opposite). If the latter player returns the shuttle before it touches the floor, it is to be returned by one of the 'in' (or serving) side, and then returned by one of the 'out' (or receiving) side, and so on, until a fault is made or the shuttle ceases to be 'in play.' If a fault is made by the 'in' side, the server's hand is out, and as the side beginning a game has only one hand in its first innings, the player in the right-hand opposite half court now becomes the server; but if the service is not returned or the fault is made by the 'out' side, the 'in' side secures the ace. The 'in' side players then change from one half court to the other, the server now being in the left-hand half court and serving to the player in the opposite left-hand half court. So long as a side remains 'in,' service is delivered alternately from each half court into the half court diagonally opposite, the change being made by the 'in' side when, and only when, an ace is added to its score. The first service of a side in each innings shall be made from the right-hand half court. After the service is delivered the server and the player served to may take up any positions they choose on their own sides of the net, irrespective of boundary lines. A fault made by either player of the side which is 'in' puts the server out; if made by a player whose side is out it counts an ace to the 'in' side.

A fault consists in breaking one of the following rules: (a) If the service is overhand (i.e. above the level of the wrist). (b) If in serving the shuttle falls into the wrong half court. (c) If the server's feet are not in the half court from which service is at the time being in order, or if the feet of the receiver are not in the half court into which service is at the time being in order. (d) If either in service or play the shuttle falls outside the boundaries, or passes through or under the net. (e) If the shuttle while in play be struck before it crosses to the striker's side of the net. (f) If while the shuttle is in play a player touch the net or its supports with racket, person, or dress. (g) If the shuttle be hit twice in succession by the same player or by a player and his partner. (h) If a player wilfully obstructs his opponents.

Note 1.—A service is delivered as soon as the shuttle is struck by the server's racket. Note 2.—A foot on the line is out of court. Note 3.—A shuttle falling on any line is held to have fallen in the court. Note 4.—A shuttle is 'in play' from the time it is hit by the server's racket until it touches the ground at the end of the rally.

The two-handed or single game consists of one player on each side. The above rules hold good, except that (a) the players shall serve from and receive service in the right-hand courts only when the server's score is 0, or when he has scored an even number of aces in the game, the service being delivered from and received in the left-hand half court when the server has scored an odd number of aces; (b) both players shall change half courts after each ace has been scored, and consecutive services shall be received by the same player; (c) in ladies' singles the game shall consist of 11 aces, setting at 9 and 10 being permitted as at 13 and 14 in a game of 15 aces. Note. The courts for the single game are laid out as provided in Diagram B.

The 4 kinds of strokes used in the game are: (1) clears, (2) drop shots (both of a defensive character), (3) smashes, and (4) drives (both of an offensive character). A clear is a high deep stroke to the back of the court. A drop is a stroke that falls just over the net. A smash is a hard-hit overhead stroke. A drive is a hard flat stroke just clearing the net.

B. is one of the fastest of games, but owing to the light weight of the racket and shuttle players of all ages and both sexes meet on greater equality than in any other active game. The moderate cost is another item in its favour and accounts for thousands of devotees. The greatest living authority on the game is Sir G. A. Thomas, author of *The Art of Badminton*, 1923. See also J. H. C. Prior, *How to play Badminton*, 1922, and G. S. B. Mack, *Badminton*, 1925.

Badminton, or Great Badminton, vil. of Gloucestershire, England. (Pop. 383.) Here is the seat of the duke of Beaufort, B. House. It is an imposing mansion in the Palladian style of architecture, surrounded by fine grounds. B. House has given a name to the game described in the preceding article, to a kind of claret cup, and to the B. Library.

Badminton Club, London sporting club founded in 1876 and named after the estate of the duke of Beaufort. It is located in 55 Park Lane, London, W.; the entrance fee is 20 guineas, and the ann. subscription is 8 guineas.

Badminton Library, set of books on sport and pastimes embracing 26 subjects in 29 vols., projected by a member of Longmans' firm and ed. by the eighth duke of Beaufort and A. E. T. Watson between the years 1885 and 1902.

Badnara, tn. of Berar, in the dist. of Amrat, India. It contains a spinning and weaving mill, and is situated on the Great Indian Peninsula railway. Pop. 11,000.

Bados, tn. of Luzon, Philippine Is., in the prov. of Ilocos Norte and about 20 m. S.W. of Laong. Pop. 11,000.

Bad Nauheim, see NAUHEIM.

Badoglio, Pietro (b. 1871). It. general and duke of Addis Ababa, b. in Sicily. Served in Tripoli in the Italo-Turkish war. In the First World War he commanded a corps at Caporetto (q.v.) and was instrumental in reducing the



stronghold of Gorizia (q.v.). Signed the armistice on behalf of Italy. Chief of staff to Mussolini. Succeeded Gen. de Bono as commander-in-chief of the It. Army invading Abyssinia late in 1935, and brought the war to a successful conclusion in the spring of 1936. Created marshal in 1936. Was never an enthusiastic collaborator with the Fascists in the war against the W. Allies, and in Dec. 1940 he resigned the post of supreme commander of the It. armed forces, no details being given. On the fall of Mussolini, he became Prime Minister and announced his intention to summon the Senate and Chamber in order to set up a constitutional democratic form of gov., but it was not long before he resigned, it being evident to the Allies that his political views and past were incompatible with the kind of peace terms the Allies would impose on a nation which still retained Fascist elements.

**Badrinath**, peak in the Himalayas 23,210 ft. above sea-level. On one of its slopes stands the temple of Srinagar, whose thermal springs, supposed to be endowed with the power of cleansing away sin, are frequented by thousands of pilgrims.

**Baduria**, tn. of W. Bengal, India, on the Jamuna R., a branch of the delta of the Ganges. It has a considerable trade in molasses and sugar. Pop. 13,000.

**Bæda**, see **BEDE**.

**Baedeker, Friedrich** (1844-1925), Ger. publisher, son of Karl B. Became head of his father's business in 1878. Largely responsible for the accuracy in style of the famous B. guides, the scope of which he extended by embracing in them descriptions and information about countries outside Europe.

**Baedeker, Karl** (1801-59), Ger. publisher and writer, b. at Essen, where his father carried on business as a bookseller. He started a book shop at Coblenz in 1827, where he d. His fame chiefly remains on account of his excellent guides. The first guide he pub. was a handbook on the Rhine. B. guides came to be considered the most reliable series in the market. They have been trans. into many languages, the Eng. eds. appearing in 1861. The business was removed to Leipzig in 1872.

**Baekeland, Leo Hendrik** (b. 1863), Amer. chemist, b. Ghent, Belgium. Associate prof. of chem., univ. of Ghent, 1882-89, and later prof. of chem. and physics, Bruges. Went to U.S.A. 1889, and has since been engaged in chem. research. Collaborated in developing Townsend electrolytic cell for big power company, Niagara Falls. Member of Naval Consulting Board, 1915. Awarded Nichols medal of Amer. Chemical Society, 1909; John Scott medal, by Franklin Institute, 1910; Perkin medal for industrial chemical research, 1916; grand prize, Panama Pacific Exposition, 1915, and many others, in recognition of his work in organic chem., electrical insulation, and electrolysis. He was the inventor of the substance bakelite (q.v.), and holds many patents in the U.S.A. and in other countries on the

subjects of organic chem., electric insulation, synthetic resins, plastics, etc. He has contributed to numerous publications on photo-chem., electro-chem., patent reform, and also on social and philosophic subjects.

**Bael**, or **Bhel** (*Ægle marmelos*), Indian tree prized for its fruit, which is of the orange order. The ripe fruit is agreeable, and the unripe fruit may be dried and used as an astringent. Yellow dye is derived from the rind.

**Baena**, tn. in the prov. of Cordova, Spain, about 30 m. S.E. of Cordova. Near B. is the castle which belonged to Gonzalvo di Cordova, the famous captain. Pop. 18,000.

**Baer, Karl Ernst von** (1792-1876), Ger. zoologist, b. at Plep in Estonia. His studies and researches in embryology resulted in his discovery of the human ovum on which he wrote a treatise *Epistola de Ovi Mammalium et Hominis Genesi*. His next great work was his *History of the Evolution of Animals* (*Über die Entwicklungsgeschichte der Thiere*). This book explodes the animalculist theory and proves that the Graafian follicles in the ovary are not eggs, but the real ovum is the spherical vesicle contained by them. He then traced the development of the fertilised egg and the order of the appearance of the organs of the body. B. was appointed librarian of the Academy of Sciences at St. Petersburg in 1834. He made studies of the fish of the Baltic and Caspian seas. Towards the end of his life he pub. his autobiography. The work of B. influenced Huxley and Spencer, and he is regarded as the founder of comparative embryology.

**Baerle, Caspar van**, see **BARLEUS**.

**Bætica**, one of the three provs. into which Augustus divided Hispania, the Sp. peninsula. The other two were Tarraconensis and Lusitania. B., called after the R. Bætis (= Guadalquivir), was separated from Lusitania by the R. Anas (= Guadiana), and from Tarraconensis by an imaginary line drawn from the Anas to the promontory Charidemus in the Mediterranean. B. was made into a Rom. colony, with Corduba as its seat of gov. The Romans praised the climate and the fruit. The early trade of the country was chiefly in horses, asses, sheep, and wool.

**Bætis**, Rom. name of the modern Guadalquivir, riv. in Spain.

**Baeyer, Johann Friedrich Wilhelm Adolph von** (1835-1917), Ger. chemist, b. at Berlin, d. at Munich. Studied chem. and physics under Bunsen and Kekulé; prof. of chem. at Strasburg (1872). From 1875 he lectured at the univ. of Munich. He was awarded the Davy medal by the Royal Society in 1881, and the Nobel prize in 1905. He was a leading authority on the chem. of indigo and made valuable contributions to the knowledge of theoretical chem. He was the inventor of aspirin (q.v.).

**Baeza**, a tn. in the prov. of Jaen, Spain, 9 m. from a station of its own name which is 160 m. S. of Madrid. It is the *Beaia* of the Romans, and was once a flourishing

Moorish city. There is a cathedral and the remains of the univ. (1533). The city was sacked by the Castilians, 1228. Pop. 15,000.

**Ba-Fan**, see FANS.

**Baffa**, see BAFFO.

**Baffin**, William (1584-1622), Eng. explorer and navigator. Accompanied James Hall on a voyage in search of the N.W. passage, when for the first recorded time long, at sea was determined by astronomical observation. In 1613 he commanded a whaling fleet to Greenland, and in 1615 he was the pilot of the *Discovery* under the leadership of Robert Bylot, when the bay now called by his name was discovered. He was killed at Kismis, near Ormuz, in 1622, whilst engaged in an Eng. expedition acting in conjunction with the Persians to drive the Portuguese out of the Persian Gulf.

**Baffin Bay**, sea passage extending between N. America and Greenland. It communicates with the Atlantic Ocean by Davis Strait and with the Arctic Ocean by Smith Sound and Lancaster Sound. It is about 800 m. long, with a mean breadth of 280 m. It was called after William B. (q.v.). The whale and seal fisheries are important. Other animals are the walrus, ducks, sea-birds, and on the coast-land bears and foxes.

**Baffin Land**, is. lying W. of Greenland, called after B. (q.v.). The coast is mountainous and inhabited by Eskimos. Area 231,000 sq. m.

**Baffo**, or **Baffa** (a Venetian corruption of Paphos), seaport in the W. of Cyprus, an important tn. in Rom. times (Acts xiii). See PAPHOS.

**Bafulabe**, Fr. military station in the Sudan, on the R. Senegal, W. Africa. It has a large fort, and is of commercial importance. Pop. 1700.

**Bagagem**, tn. in the prov. of Minas Geraes, Brazil, on the R. B. Diamonds are to be found in the surrounding dist. Pop. 10,000.

**Bagalkot**, tn. in the Bijapur dist. of Bombay, India, on the R. Ghatprabha, trib. of the Kistna. Its manufs. are silk and cotton. Pop. 19,000.

**Bagamoyo**, a seaport and trading settlement in Tanganyika Ter., lying in lat. 6° 26' S. and long. 38° 55' E., 36 m. to the N.W. of Dar-es-Salaam. Prior to the construction of the railways B. was the chief starting point for the interior, whence Lake Tanganyika could be reached in two months by caravan. It was once the centre of the Arab slave trade, since the suppression of which and the construction of railways it has been eclipsed by Dar-es-Salaam. Burton, Speke, Stanley, and other explorers took it as their starting point for the interior. It is the seat of a Rom. Catholic bishopric and there is a Fr. mission. The Rom. Catholic father of the Holy Ghost landed at B. in 1867 and built a hospital and school N. of the present tn. These buildings were destroyed by a cyclone, but rebuilt, and it was at the door of the old church, which still exists, that a party of footsore native carriers in 1873 deposited the remains of Livingstone at the feet of

the father-in-charge. The surrounding dist., also called B., has a mixed pop., both Africans and Asiatics, who are mainly engaged in growing tropical fruit. There is a considerable trade in copra; other products are rice, gum copal, maize, mahogany, sweet potatoes, cotton, and ground nuts. Until 1914 B. was in Ger. E. Africa. It was occupied by the Brit. on Aug. 15, 1916. Pop. 5200.

**Bagaria**, see BAGHERIA.

**Bagasse** (Fr.), sugar trash; crushed stalks of the cane after the juice has been expressed. Used as fuel.

**Bagatelle** (Fr., from It. *bagatella*, a trifle): 1. Thing of no importance. 2. Game, possibly derived from billiards. It is played with balls on a board or table varying in size from 6 ft. by 1½ ft. to 10 ft. by 3 ft. The bed, either slate or wood, is covered with green cloth, and has at its upper end nine numbered cups to receive the balls. Round the sides there is an india-rubber cushion. The balls used are 9 in number, generally 1 black, 4 red, and 4 white; the black ball is placed on a spot about 9 in. in front of the first hole, and at the player's end, about 18 in. up, there is a balk line, with another spot behind it from which to start play. These measurements vary with the size of the table. The balls are struck with a cue, as in billiards, and the object is to drive them into the holes, the black ball counting double. There are sev. forms of B., the most usual being: (a) Ordinary B. In this game each player sends all the balls up; no score is allowed until the black ball has been touched. (b) Fr. game. Two players, or 4 in partnerships, take part, playing alternately. The rules as to scoring vary slightly in different forms of this game. (c) Cannon game. This more resembles billiards, and may be played with either cups or pockets, or both. (d) Mississippi. Played with a bridge having 9 or more numbered arches (according to the size of the table), through which the balls must be played off the cushion.

**Bagdad**, or **Baghdad**, vilayet of Iraq. Area 42,643 sq. m. The vilayet includes the divs. B., Diyala, Kut, Diwaniyah, Hillah, Kerbala, and Dulmal. The country is watered by the Euphrates and the Tigris, but the soil is, in general, poor and unproductive. There is a mixed pop. of Turks, Arabs, Jews, Armenians, and Kurds, the number of which is estimated at 1,736,000. Cap. Bagdad.

**Bagdad**, or **Baghdad**, Moslem city in Iraq, once renowned for its learning and culture, for its flourishing trade, for its minarets and gardens, and for the E. splendour of the life within its palaces. The modern tn. is situated on the E. bank of the Tigris, and is connected with the old tn. on the opposite bank by 2 pontoon bridges, 650 ft. and 715 ft. long respectively. It is enclosed by an old brick wall, half in ruins, and a dry moat. The tn. is a place of pilgrimage. Many nationalities congregate within its walls, Arabs, Turks, Jews, Persians, Armenians, Hindus, Syrians, and Kurds. The religious bodies that predominate are Muslims, Shi'ites, and Sunnites. Trade

from Persia passes through B. to Iraq, and is carried by boat and caravan. Leather, silk, cotton, and woollen goods are manufactured in the tn.; the prin. exports are leather articles, woollens, oriental fabrics, fruits, dates, skins, feathers, and horses.

During 762-66 the tn. was built by Abu Jaffar 'al-Mansur, the Victorious, second caliph of the Abbasid dynasty, who founded it on the ruins of Seleucia and Ctesiphon. It was enlarged by Harun-al-Rashid, and for 500 years remained the cap. of the Abbasids, during which time it reached the height of its prosperity and harboured a million and a half people within its walls. It was called Dar-es-Salam, the dwelling of peace. In 1258 Hulaqu subjugated the Abbasids; in 1393 the city was captured by Timur. During the sixteenth century Shah Ismail, the founder of the Persian Saffi dynasty, took possession for a time, but the Turks and Persians repeatedly struggled for the city. In 1638 it was annexed to the Ottoman empire by Amurath. In 1755 a Brit. trade agency was estab. there as a branch of the E. India Company's Basra office. Another W. innovation was the opening of a telegraph at B. in 1861. B. became the centre of European politics towards the end of the nineteenth century in connection with the proposed railway, by which it was intended to link up the Persian Gulf with Turkey. The railway had been started in 1871 from Stamboul. It reached Angora in 1887 and Konia in 1896. See BAGDAD RAILWAY. In 1910 a Ger. wireless station was opened. Col. (later F.M.) von der Goltz, and later, Gen. Liman von Sanders Pasha arrived to reorganise the army on Ger. lines. The effect of these innovations was to introduce anti-Brit. influence into the city's life.

On the outbreak of the First World War B. became the base of operations against the Brit. forces at Basra and Shaiba. To improve the communications with various parts of the city a main street was made in 1915. In the summer of 1916 F.M. von der Goltz, who was in command of the Turkish-Ger. forces in this area, d. of typhus in B. in the house in which the Brit. Gen. Maude d. later. On Mar. 4, 1917, Maude advanced against the Turks and on the 10th the Brit. occupied B.

The little that survives of the anct. city of the Abbasids is in the shape of a few mosques and shrines. These include the arch and gateway of the Mirjanīyeh mosque and medreseh (fourteenth-century) which stands near Exchange Square; the very worn minaret el Ghazi in the poor quarter of the *suk* (bazaar) el Ghazi and conjectured by L'Estrange and others to have adjoined the great palace of the Abbasids: the medreseh el Mustansiriyeh, situated on the Tigris, which was once a flourishing school but is now used as a customs house, and the Aquliyah mosque (thirteenth century); the tomb of Zobeide (q.r.) in the 'city of the dead' or the anct. burial ground, where also are various other shrines such as that of the mystic Sheikh Jonayd (tenth century)—

a shrine visited by childless women; the tomb of the Jewish rabbi Joshua, and the much-venerated tomb of the mystic Mansur al Hallaj. A very notable Sunni shrine is that of Abd-el-Kader, the so-called Moslem St. Francis, which stands near the Sporting Club, and contains the tomb of el-Kader in a silver grille. Europeans do not usually enter this shrine or mosque. The shrine of Abu Hanifa, the jurist, is also a noted Sunni relic. The medieval walls of B. on the S. and E. can be traced, though very little has survived the destruction by Midhat Pasha, governor of B. in 1860, who replaced the walls with fortifications but left the gates Bab el Wastani and Bab el Tilism (Talisman). The latter was blown up by the Turks in the First World War. The citadel, which rises up from the N. quarter of B., is encircled by a high wall. A fine view is to be had from its watch tower. Here, too, is the ruined palace of the Caliph Mamun, son of Harun-al-Rashid, with Cufic inscriptions on its arches, doorways, and lintels. It is considered one of the best examples of Abbasid architecture in the city. Another fine relic is the Khan el Ortman which stands at the entrance to the *suks*. These *suks* or bazaars are large and comparatively modern. In the narrow streets may be seen silversmiths, vendors of slippers, beggars in sackcloth; Kurdish porters, and walling minstrels; and crouching scribes who send messages for the illiterate—all vividly recalling the B. of fairy tales, notwithstanding the offends in European dress, cinemas, electric light, telephones, and motor cars. A well-known bazaar is the so-called 'Thieves' Bazaar,' a shabby place where many a fine bargain has been picked up. Mention should be made of the museum, which is located in the gov. Press Buildings in Bridge Street. It contains many recent finds from the excavations of Ur (q.r.), Kish (q.r.), and other anct. sites of Mesopotamia (see also BELI, GERTRUDE). Pop. 170,000. Consult E. S. Stevens, *By Tigris and Euphrates*, 1923; Sir Mark Sykes, *The Caliphs' Last Heritage*, 1915; R. Coke, *Bagdad*, 1927; Freya Stark, *Bagdad Sketches*, 1932.

By 1918 B. had become a modern city, with railways, postal service, telephones, electric light, riv. bridges, new thoroughfares, and a proper currency. A univ. was opened in 1926. B. is a stage in the air routes to India and Australia. B.'s modern airport is used by Brit. Overseas Airways, K.L.M., Air France, and the Iranian State air-lines, and is busy with transcontinental traffic. Pop. (estimated) 340,000.

**Bagdad Railway.** The B. R. or Euphrates Valley railway scheme to construct a line from Konia, in Asia Minor, to B. and Basra, and thence on to the Persian Gulf, was brought forward for discussion in 1899. The Russian and Brit. proposals were rejected, and by a provisional convention preference was given to a Ger. company in 1903. England had a particular interest in the scheme, as the line would provide a short route to

India; accordingly in 1903 the Brit. Gov. objected to the railway being placed under Ger. control, and discussion followed with a view to putting the line under international control. By the agreement of 1903 it was decided the Ger. group should control 40 per cent of the capital, the Fr., through the Imperial Ottoman Bank, 30 per cent, the Austrian, It., Swiss, and Turkish 20 per cent, and the Anatolian railway 10 per cent. In 1904, 124 m. of the line were completed, from Konia, through Ereğli, to Bugurlu. In 1908 sanction was given to extend the line eastwards from Bugurlu across the Taurus to Adana. One of the causes of the First World War was Germany's ambitious policy in the S.E. of Europe, and Prince von Bülow before 1914 openly advocated the exploitation of the B. R. as opening 'to Ger. influence and enterprise a field of activity between the Mediterranean Sea and the Persian Gulf, on the Rs. Euphrates and Tigris' (consult his *Imperial Germany*). In the early years of the twentieth century England, with the view of conciliating Germany, began negotiations for the settlement of matters of common interest, and among these was the question of the B. R., in the exploitation of which considerable concessions were made to Germany. But Germany's plan was to project the route between Vienna and Salonika into a grand Pan-Ger. route from Berlin to B., and thereby not only destroy the value of the Suez canal, but lead up gradually to the domination of Egypt, Syria, Persia, and India. But with the conquest of Mesopotamia by the troops of Gen. Maude in the First World War, Ger. ambitions in B. were shattered. The line crosses the Euphrates at Jerablus and is open to goods and passenger traffic as far as Tell-Kochak on the Syro-Iraq border. Railheads at Tell-Kochak and Kirkuk are connected by motor service. In 1936 the Iraq Gov. decided to connect B. with Mosul and Tell-Kochak by a line prolonging the existing B.-Baiji line and this work was completed in 1939, thereby making it possible to reach B. by through train from Europe. The total length of the line now open is 966 m. (standard gauge). Consult E. M. Farie, *Turkey, the Great Powers and the Baghdad Railway*, 1923.

**Bagé**, tn. in the state of Rio Grande do Sul, Brazil, on the R. Negro, a trib. of the Paraguay. Pop. 22,000.

**Bagshot, Walter** (1826-77), Eng. journalist, economist, and political writer. He was the son of a banker at Langport, Somerset, took his degree at London Univ., and was called to the Bar in 1852, but gave up law for literature, while retaining for many years a close connection with banking, which gave practical value to his economic studies. In 1858 he married Miss Wilson, daughter of the first editor of the *Economist*. Being in touch with many leaders in political and commercial life, including Gladstone, Sir George Cornewall Lewis, Robert Lowe, and prominent city bankers and merchants, he was able to write on

politics and finance as one acquainted with their innermost working. His books, *The English Constitution* and *Lombard Street*, show not only observation, but deep research into the principles of gov. and finance. The theory of a practical banking reserve is developed by him with great clearness. His *Physics and Politics*, pub. in 1869, was successful abroad as well as at home. He was for many years editor of the *Economist*, and also helped to edit the *National Review*. His *Literary Studies* and *Economic Studies* were pub. after his death. Life by Mrs. Russell Barrington, 1914, and by Wm. Irvine, 1939.



Paul Popper

BAGGARA

**Bagelen**, prov. of Jiva, bound by the Indian Ocean on the S.; pop. 1,500,000.

**Bagenalstown**, see BAGNALSTOWN.

**Bagford, John** (1650-1716), collector of rare books, both on his own account and on commission for booksellers and amateurs. He was b. in St. Anne's par., Blackfriars, and began life as a shoemaker. He formed 2 collections, known as the Bagford Ballads, in which many old Eng. ditties have been rescued from oblivion, and the Bagford Fragments, an 'enormous collection of title-pages and other fragments in 64 vols. folio,' which earned him the description of 'shoemaker and biblioclast.' Apparently they were intended as materials for a hist. of printing. They came to the Brit. Museum among the Harleian MSS. The Bagford Ballads were pub. in 1878 (ed. by Ebbsworth). He was one of the revivers of the Society of Antiquaries. See Arundell Esdaile, *The British Museum Library*, 1946.

**Baggaras**, a Moslem race of Bedouins who dwell in the valley of the Nile. Their chief occupation is cattle-rearing.

**Baggesen, Jens Immanuel** (1764-1826), Dan. poet, b. at Korsør, d. at Hamburg. While a student at Copenhagen, he pub. *Comic Tales*, 1785. In 1811 he was appointed prof. of the Dan. language and

literature at Kiel, but after 3 years returned to Copenhagen. He quarrelled with Öhlenschläger, and in 1820 left Denmark and never returned. He wrote much in Ger. as well as in Dan. His works include *Labyrinth*, 1792, and *Parthenais oder die Alpenreise*, an epic idyll, 1804. B. excelled in serio-comic satire.

**Baghal**, or **Baghul**, native state in the Punjab, not far from Simla. Area 124 sq. m.; pop. 25,000.

**Baghdad**, see BAGDAD.

**Baghelkhand**, or **Bagelkhand**, dist. in Central India, including sev. native states, of which the chief is Rewa; others are Nagode, Maihar, Sohawal, and Kothli. Until 1871 they were included in the Bundelkhand Agency. Area 14,000 sq. m.; pop. 1,550,000.

**Bagheria**, or **Bagaria**, tn. at the E. end of the bay of Palermo, Sicily, once the residence of the chief Palermitan families. Pop. 20,300.

**Bagimond's Roll**, originally named from Bolamund or Bagimund of Vicci, or Vitia, who was sent by Pope Gregory X. to assess the church revenues of Scotland for the purpose of raising a crusading fund, A.D. 1274. The Scottish clergy wished to retain the old assessment as a basis, but Bagimund, under Pope Gregory's instructions, insisted on a new return, founded on the real value at the time of inquiry, 1275. Part of this return has been preserved, and is known as B. R.

**Bagirmi**, or **Baghermi**, Moslem kingdom of W. Africa, lying S.E. of Lake Chad. It is a Fr. possession. The people are of negroid race and number about 150,000. The cap. is Massenia.

**Bagnacavallo**, tn. in Emilia, Italy, 11 m. W. of Ravenna. Formerly called Tiberiacum. Pop. 16,000.

**Bagnacavallo**, **Bartolommeo**, see RAMENGHI.

**Baginastown**, or **Bagenastown**, tn. in co. Clare, Ire, 10 m. due S. of Carlow on the Great S. railway. Pop. 2000.

**Baginara**, tn. in the prov. of Reggio di Calabria, Italy, nearly opposite Messina. Founded by Robert Guiscard, duke of Apulia and Calabria, in the eleventh century; suffered from earthquake in 1783; and again in Dec. 1908 when almost every house was laid in ruins. Pop. 11,000.

**Bagneres-de-Bigorre**, watering-place in the dept. of Hautes-Pyrénées, France, situated on the Adour. The Romans called it Aque Bigerrionum or Vicus Aquensis. There are springs of sulphate of lime, and the tn. is visited by invalids and tourists. Pop. 9000.

**Bagneres-de-Luchon**, watering-place in the dept. of Haute-Garonne, France, near the Sp. frontier. There are 48 mineral springs. The Romans knew it as Balnearia Lixovienses. Pop. 600.

**Bagnes**, name given to the Fr. convict prisons which were substituted for the galleys in 1748. As the latter had naturally been stationed at the naval ports and arsenals, the B. were estab. in the same localities, and remained until the middle of the nineteenth century. About

1852, the last 3, at Brest, Rochefort, and Toulon, were closed, and convicts were deported to Cayenne. The miseries of prisoners in the B., like those of galley-slaves, were extreme, and have often been described by writers of fiction. Jean Valjean, in Hugo's *Les Misérables*, was a sufferer there. The word *bagnes* is derived from the It. *bagno* (q.v.).

**Bagnes**, **Val de**, valley in the W. of Switzerland, canton Valais. Its lower end opens into the valley of the Rhône, near Martigny. A catastrophe occurred here in 1818; the R. Dranse was for two months blocked by falls from the Getroz glacier; when the ice-dam burst the valley was devastated by a flood 90 ft. deep.

**Bagni di Lucca**, commune of Lucca, Italy, noted for its warm springs, temp. 98° to 130°, which give off CO<sub>2</sub> and contain lime, magnesium and sodium. These springs are in the Val di Lima, and are mentioned as far back as 1284, but were first made widely known by the physician Fallopius in 1569. Chief resorts, Ponte Seraglio (pop. 1300) and Bagno Caldo (pop. 12,000).

**Bagni di San Giuliano**, tn. of Tuscany, 5 m. from Pisa, Italy. It has mineral springs and manufs. soap and candles. Pop. 21,000.

**Bagno**, It. word signifying a bath, also used in other senses. The B. at Galata (Constantinople) was a place of detention for slaves; in London (seventeenth and eighteenth centuries) a B. was a house of ill fame.

**Bagno a Ripoli**, tn. 5 m. from Florence, Italy, with warm baths. Pop. 17,870.

**Bagno in Romagno**, watering-place 35 m. E. by N. of Florence, Italy, on the R. Savio, near its source; has hot springs (about 110°) containing natron. Pop. 10,645.

**Bagnoles**, vil. in Orne, France, 13 m. S.E. of Domfront. It has hot and cold mineral springs. Pop. 370.

**Bagnolet**, suburb of Paris. It has gypsum quarries and fisheries. Pop. 27,000.

**Bagnols-les-Bains**, vil. in the dept. of Lozère, France, 8 m. from Mende. It has mineral springs. Pop. 400.

**Bagnols-sur-Cèze**, tn. in the dept. of Gard, France, on the R. Cèze, a trib. of the Rhône, 13 m. N.E. of Uzès. The silk-mills, built on the banks of the Cèze, are the chief industrial features of the tn. Fine wines are also produced. It is supposed that the Romans had baths here, as some ant. monuments have been found from time to time. Pop. 4000.

**Bagnone**, tn. in the prov. of Massa e Carrara, Italy, at the foot of Mt. Orsajo. Pop. 1000.

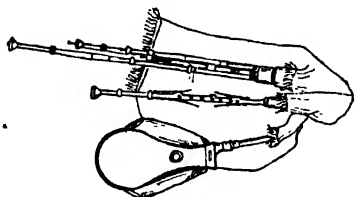
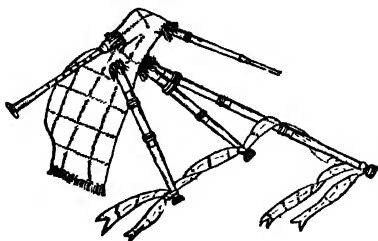
**Bagos** (Persian *Bagoi*), a name often given to eunuchs. The best known of these (called by Josephus *Bagoses*) was vizier of Artaxerxes III., and practically master of the Persian kingdom. He murdered 2 kings in succession, and tried to poison Darius III., but the king was warned, and made *Bagoses* drink the poison himself. See Josephus, *Ant.* xi. 7; Diodorus, xvi. 50, 51, xvii. 5.

**Bagot**, Sir Charles (1781-1843), Eng.

diplomatist and 34th governor-general of Canada, b. Sept. 23. He negotiated the Rush-B. treaty (1817), which is still in force, between Great Britain and the U.S.A., limiting the armaments of each country on the Great Lakes. Was ambas. at St. Petersburg in 1825 when the agreement with Russia was signed defining the N.W. boundary of Brit. N. America. Though his tenure as governor-general of Canada (1842-43) was brief, his administration prepared Canada for the self-gov. which she received not long afterwards from Lord Elgin (1847-1854). This B. achieved by forming a dual administration of both sections of the country, Upper and Lower Canada, a div. which was retained until the Confederation (1867) and which, in his time, corresponded to the Reformers (Liberals) of both sections. It was on B.'s initiative that the geographical survey of Canada was begun in 1843. He d. at Kingston, Ontario, May 19, 1843.

**Bagpipe**, musical instrument, being a development from the primitive reed-pipe. Its characteristics are the bag for the wind-supply and the peculiar 'drone' which furnishes the ground bass. The former may be inflated either by a blow-pipe, as in the Highland B., or by a bellows worked by the arm, as in the musette (Fr.) and the Northumbrian pipes. Every instrument has these prin. parts: (1) the wind-bag; (2) the chanter, or melody-pipe, which always has a double reed, and lateral holes for fingering; (3) the drones, each of which has one invariable sound, but can be tuned by means of sliding joints. The compass of the chanter ranges from 9 notes in the Highland pipes to 12 in the Irish and 15 in the Northumbrian. The musette, as improved by Hotteterre in the seventeenth century, had a wider range, and was popular in France, being played at court and in the opera; Lully wrote music for it. In a Highland pipe the notes of the chanter do not correspond with those of the diatonic scale, and are not strictly in tune. The same note cannot easily be repeated without the interpolation of grace notes, known as warblers; these, introduced to overcome a difficulty, form one of the chief beauties in pipe-music, 'brilliance in his warblers' being one of the distinguishing marks of a skillful player. 'The key of the Highland pipe is that of A major with a natural G and with the C and the F something between the sharp and the natural—a unique scale, but one with some similarities to certain scales of the Near E.' (Scholes). (The normal key of the Northumbrian pipe is G and it has usually 4 drones tuned to G and D.) The B. is suitable both for solemn funeral marches and laments and for the liveliest dances. As for its antiquity, a drone-pipe with reed complete has been found in an Egyptian mummy-case. The Romans had pipes and introduced them into S. Britain, whence they spread into Caledonia and Ireland, and survived there after they d. out in England. They are mentioned in Ireland as early as (possibly) the fifth century. The modern Irish

'union-pipe,' like the musette, is blown by bellows worked by the arm. The old Ger. *Dudelsack* was made in sev. forms varying in their range: one is said to have had separate chanters, on which a two-part melody could be played.



BAGPIPES

Above, Scottish; Below, Northumbrian

**Bagradas**, anct. name of the Medjerdah or Mejirda, African riv., which rises in the Great Atlas and flows in a N.E. direction into the gulf of Tunis. Its length is nearly 300 m.

**Bagratidæ**, dynasty of monarchs in Armenian hist., founded in A.D. 885 by Aschod I., who claimed to be descended from King David of Israel. Armenia was then a trib. kingdom under the caliphate. (See ARMENIA.) The rule of the B. was for 2 centuries prosperous. On the dissolution of the kingdom as a result of civil war in the eleventh century, the B. retired to Georgia (conquered by them c. A.D. 1000), and ruled there until 1800, when Georgia was annexed by Russia.

**Bagration**, Peter Ivanovitch, Prince (1765-1812), Russian general, descended from the Georgian branch of the Bagratidæ. In 1805, covering the retreat of Kutusov's army before superior numbers under Murat, he showed skill and courage, losing half his men, but saving the main army. He served in sev. lost battles, Austerlitz, 1805, Eylau, and Friedland, 1807, but always won personal distinction. When Napoleon invaded Russia in 1812 B. commanded the 2nd Russian Army. As before he was unsuccessful, being beaten by Davout at Moghilev, July 23, but succeeded in rejoining the main force under Barclay. On Sept. 7 he was mortally wounded at Borodino.

**Bagshaw**, Edward (d. 1662), Eng-royalist and author. Graduated at

Brasenose College, Oxford, 1608, and entered the Middle Temple. In 1639 he was elected Lent reader, and delivered lectures in favour of Puritan principles. He was elected M.P. for Southwark, 1640, and sat in the Parliament convened by Charles I. at Oxford, 1644. He was imprisoned by the parliamentarians, 1644-46, during which time he wrote *De Monarchia Absoluta*.

**Bagshot Sand, or Beds**, part of the Upper Eocene strata found round London, especially in Surrey, and stretching as far S. as the Isle of Wight. The heaths of Surrey and Hampshire belong to this formation.

**Bagster, Samuel** (1772-1851), Eng. publisher. He began as a bookseller in the Strand in 1794, and in 1816 removed to Paternoster Row. The firm which he founded is famous for its eds. of polygot Bibles, including the *Biblia Sacra Polyglotta Bagsteriana*, 1817-28, for an octoglot ed. of the Church of England liturgy, 1821, and for *The English Hexapla*, 1827.

**Baguette, or Baguet** (Fr. a small wand), architectural term for a small convex moulding of semicircular section of the same type as the astragal. When ornamented it is called a chaplet.

**Baguio**, summer cap. of the Philippine Is., and cap. of Benguet prov. It is picturesquely situated in the mt. dist., Luzon, a dist. which includes what were formerly known as the B. and Suyoc mineral dists. The tn. is built at a high elevation and in the vicinity of splendid pine-woods. It became a chartered city over 20 years ago, and has been much modernised. Pop. 8400.

**Bagul**, see BAGHAL.

**Bahai', or Babi**, the believers of a modern Persian sect founded by Mirza Ali Mohammed, who was b. at Shiraz in 1819, and who adopted the title Babi-Din, Gate (or Intermediary) of the Faithful, and shortened into Báb. The religion of the B. is eclectic, containing germs of what is best in Mohammedanism, Judaism, Christianity, and Parseism. The Báb made several pilgrimages to Mecca and other sacred places, and was believed by many to be the Mahdi promised by Mohammed to save the nations. Both orthodox Muslims and State conspired to overthrow him, and as a result he spent the greater portion of his teaching life in prison, his followers zealously carrying on his work of proselytisation. The Báb was finally shot before the eyes of the people in front of the citadel at Tabriz (c. 1850). The body was recovered by his followers and enshrined at Jehram, and subsequently conveyed to Acre in Syria, where it now rests. After the death of the Báb his adherents were deported to Constantinople and Cyprus, but in spite of oppression Bábism still prevails in many parts of Asia and America. The number of martyrs to this creed is more than 20,000. Two-thirds of the Bahais are drawn from the Mohammedan world and the remainder from the other great world faiths. The leadership of this sect was assumed in the sixties by Baha'u'llah, a

Persian nobleman, who in prison at Acre wrote many books. Chief among these are *Hidden Words* and the *Kitáb-i-Aqdas*. He d. in 1892, and was succeeded in the leadership by Abdul Baha, who settled in Syria, on the side of Mt. Carmel above Haifa; and who, on charges of disaffection to the Gov., was imprisoned in 1907. He obtained his liberty at the revolution of 1908. During the First World War, he and his following were under strict supervision by the Turks at Haifa, where he was energetic in averting famine. Haifa was taken by the Brit., Sept. 23, 1918; and Abdul Baha was knighted Apr. 27, 1920. He d. Nov. 28, 1921, aged 77. His will appointed, as guardian of the cause, his grandson Shogi Effendi, then studying at Balliol College, Oxford. The religion of the Bs. is based on a belief in successive revelations of the Deity. These revelations are progressive and not final. Thus Mohammed was a great prophet and his doctrines were a revelation of God, but Mohammed is not the final prophet, and the Koran is not infallible. The morality of Bábism is high. Man is regarded as an emanation from God, and as such is immortal in spirit, but the tenets of Bábism vary on the subject of individual immortality. Sometimes the individual soul co-exists with the Deity for all time; sometimes the soul is re-absorbed into the divine essence whence it emanated. At death the body and soul are reunited. Polygamy and concubinage are forbidden, and woman is held in high esteem as being the spiritual equal of man. While the religious value of a life of consistent self-abasement and asceticism is denied, a life of licence is not advocated. It is attempted rather to realise the Gk. ideal of keeping the 'golden mean' in regard to earthly pleasures. Bábism is thus founded on the intellect rather than on the emotions, and is a philosophy of life rather than a religion of the soul. The modern Bahais are said to number about 700,000 in Persia, with small groups in European countries and, especially, the U.S.A.

**Bahamas**, formerly called *Lucayos*, group of is. forming a div. of the Brit. W. Indies. They are situated in the Atlantic Ocean, lying to the S.E. of Florida, and N. of Cuba and Haiti. There are about 3000 is. in all, including coral reefs, but only 20 are inhabited. The prin. is. are New Providence, Great Bahama, Abaco, Cat Is., Harbour Is., Andros Is., Acklin Is., Watling Is., Eleuthera, and Mangana. The total area is 4375½ sq. m. The is. are long and narrow in shape, and of a low surface, the highest altitude being not more than 230 ft. The climate is so temperate that the is. have come to be a popular winter resort for Amers. The colony is sub-tropical, and both N. and tropical plants exist, the pine-tree and the palm growing side by side. There are large areas of pine-lands on sev. of the is., the land of which being unsuitable for agriculture is commonly known as 'pine-barren'. The pine makes good timber, however, the forests being let on licence to

private firms on a royalty basis. Among other woods of commercial value, there is a small export trade in gualacum (*Ilignum vite*) and cascarrilla bark. Agriculture is not extensive as it suffers from the rocky state of the land and the poverty of the soil. Certain products thrive, with the aid of fertilisers, and chief among these are sisal hemp and tomatoes. Export of sisal has diminished, but the trade in tomatoes increased. Other products are citrus fruits, maize, cotton, sugar-cane, and such fruits as tamarind, grapes, olives, and oranges. The sponge industry was one of the main activities of the is., but declined greatly during and after the Second World War. The shallow waters around Andros, Abaco, Exuma, Acklin, and Eleuthera are the chief areas for sponging. Salt is raked from the ponds in Rum Cay, Rugged Is., and Inagua, mostly for local consumption. Pineapple canning is being developed. Fishing round the is. is excellent, and a factory has been started in Bimini for the canning of crayfish, which find a market in Florida. Turtle-shell is also exported, and there is a trade in conch-shells, from the lip of which cameos are made. The constitution consists of a governor, assisted by executive and legislative councils of 9 members each, and a representative assembly of 29. All white men over 21 who have resided 12 months in the is. have a vote. Among the religious sects of the community Methodists and Baptists predominate. The Church of England was disestablished in 1869. The cap. of the B. is Nassau, New Providence. The pop. of the is. was estimated in 1942 at 73,000, of which 85 per cent are coloured races.

**History.** The B. were visited by Columbus in 1492, and he stated that the group of is. was called Lucayos, implying that the name was Indian or Arawak. While it has never been finally settled whether Watling Is. was his first landfall in Amer. waters, most authorities are agreed that it was on this is.—which Columbus named San Salvador and the Indians Guanahani—that he landed. Others think the honour belongs to Cat Is., and yet others say Great Turk Is. But Watling Is. won the official sanction of the Bahamian Legislature in 1926. A few years after Columbus landed, all the Carib inhab. were transported to work in the mines of Cuba. It does not appear that the Spaniards had any settlements on any of the is. at any time. Early in the seventeenth century the is. were well known to the settlers in Bermuda. They were included in the royal grant to Sir Robert Heath, the attorney-general of England, of Oct. 30, 1629. The Company of Eleutherian Adventurers was formed in London under the aegis of William Sayle, a former governor of Bermuda, for the purpose of making a systematic colonisation of the is., but Charles II., ignoring previous titles, granted the land, in 1670, to 6 of the lords proprietors of Carolina. Before this grant, however, the inhab. had organised a settlement and instituted a form of gov. which included an elective

House of Assembly, and had selected Capt. John Wentworth as their governor (1671). He was confirmed in office by the lords proprietors. Thirteen proprietary governors were appointed between 1671 and 1715. The settlement on New Providence was sacked by the Spaniards on sev. occasions between 1680 and 1684. In 1684 most of the inhab. were driven away, and it was not until 1688 that the settlement was re-formed under Thomas Bridges with settlers from Jamaica. Bridges became governor, and the settlement developed promisingly until, in 1703, it was practically annihilated by the Fr. and Spaniards. A year or two later, however, the dispersed inhab. returned to New Providence, and another proprietary governor was appointed in 1707. But the is. then became a regular resort of pirates, and this determined the Crown to place it under a civil and military gov. Since 1717 there has been a regular succession of royal governors. The is. were surrendered to a fleet of the Amer. rebels in 1776, and again to the Spaniards in 1781, but they had been retaken by the Brit. before the end of the war, and the peace of Versailles (1783) confirmed the Brit. in possession. In 1787 the lords proprietors surrendered all their proprietary rights to the king for £12,000, which was provided by Parliament. During the Amer. Civil war Nassau became the headquarters of the blockade runners and enjoyed a rapid prosperity, the total value of trade, which was under £500,000 in value in 1860, rising to £10,000,000 in the 4 years 1860-64. A rather similar state of affairs prevailed 60 years later when the B. carried on a roaring trade during the period of prohibition in U.S.A. That the revenue of the B. was converted in 1920 from a threatened deficit to a surplus was entirely due to wine and spirit duties. A wireless service was installed in 1923. The B. have been visited by severe hurricanes, notably in 1866, 1883, and 1929, when it was recorded that the hurricane reached a velocity of 90 m.p.h.

See Mary Moseley, *The Bahamas Handbook*, 1926; Stephen McKenna, *By Intervention of Providence*, 1923; MacLachlan Bell, *Bahamas: Isles of June*, 1934.

**Bahar** (dist. and tn.), see BIHAR.

**Bahawalpur**, a Moslem state in the Punjab State Agency, India, which acceded to Pakistan in Oct. 1947. The dist. round the Ghara and the Indus is fertile in grain and fruit, but most of the state is desert. Big game, such as tigers and boars, abounds. Area 17,285 sq. m.; pop. 985,000. The Camel Corps of the state afforded valuable help during the First World War. The cap. has the same name as the state. The manuf. of turbans, silk girdles, scarves, chintzes, flowered cottons, etc., is the chief industry. Pop. 18,500.

**Bahia**, E. prov. of Brazil, bounded on the N. by the states of Pernambuco and Piauh, on the S. by Minas Geraes, on the W. by Goyaz, and on the E. by the Atlantic Ocean. The land by the coast is fertile and woody, the climate being hot and moist. The interior is rocky, with



plateaux rising in terraces, and the climate is dry. The country is watered by the R. São Francisco and its tribs. The prin. products of the soil are sugar, tobacco, coffee, cotton, Indian corn, rice, and cocoa. Area 184,649 sq. m.; pop. 3,900,000.

**Bahia**, or **São Salvador da Bahia**, cap. of the state of B.; see of an archbishop, and a univ. tn. It is a hot, unhealthy port lying 800 m. to the N. of Rio, and is the oldest tn. in Brazil. As well as the univ., there is a medical college, a normal school, a museum, and a public library. Seaport, with a flourishing shipping trade. There is a fine harbour, protected by the natural breakwater formed between the is. Itaparica and the mainland. Industries are boots and shoes, hats, and cotton materials, which are exported with agric. produce, hides, and lute-wares. The city was visited by Amerigo Vespucci, 1603, and again by Correa, a Portuguese, in 1610. It was colonised in 1536, but abandoned, and refounded, 1549. Until 1763 it was the seat of the viceroys of Brazil, and is one of the intellectual and economic centres of the country. Pop. 376,000.

**Bahia Blanca**, a city 3 m. up the R. Naposta, prov. of Buenos Aires, Argentina. Its port on B. Bay has been handicapped by a shallow channel, but dredging operations are expected to maintain a minimum draught of 30 ft. B. B. was founded in 1823; its prosperity dates from 1885, when the first railway was opened. It exports wheat, wool, and hides. The naval station of Puerto Militar lies below the city. Pop. 80,000.

**Bahia de Todos los Santos**, see ALL SAINTS' BAY.

**Bahia Honda**, a seaport in the N.W. of Cuba, about 60 m. from Havana; trades in sugar and mining products. Its harbour is one of the deepest and most spacious in Cuba. Pop. 1400.

**Bahinda Steppe**, see BAYIDA.

**Bahlingen**, a tn. and dist. in the S.W. of Württemberg, in the region of the Black Forest. The dist. is noted for its sulphur baths. Pop. 4000.

**Bahr**, an Arabic term meaning sea, or large riv., as B.-el-Ablad and B.-el-Azrek, the White and Blue Nile. A dry riv.-bed is sometimes called B.

**Bahr, Hermann** (1862-1934), Austrian author and dramatist, b. at Linz. His plays include *The Concert* (1911), *The Fool and the Wise Man* (1912), and *Fashions in Love* (1929). During the First World War he wrote some admirable notes and critical essays on current literature, art, and music, in which he sought to justify the new movement in art by assuming the historical continuity of all artistic movements. In 1925 he wrote on expressionism (q.v.). Was also for a short time manager of Reinhardt's Deutsches Theater and then of the Vienna Burg Theater.

**Bahraich**, tn. of Oudh, India, on the R. Sarju; has a sacred shrine much visited by pilgrims. Pop. 27,500. The dist. of B. has an area of 2600 sq. m. Pop. 1,100,000.

**Bahram**, or **Varahran**, the name of 5 Persian monarchs of the Sassanid dynasty.

They were B. I. (A.D. 273-77), who is chiefly recorded as having ordered the execution of Mani, founder of the Manichæans (q.v.); B. II. (276-93), son of the foregoing, and B. III. (293), son of B. II., who reigned for only a few months. Nothing is recorded of their reigns beyond the partition of Armenia with Rome; B. IV. (389-420), son of Sapor III., and B. V. (420-39), son of Yazdegerd I. B. V. was a notorious persecutor of the Christians, a policy which involved him in war with Rome, at the end of which mutual toleration was extended to both Christians and Zoroastrians.

**Bahramabad**, tn. in the prov. of Kerman, Persia, noted for its fields of poppies; pop. 13,000.

**Bahramghat**, vil. in the United Provs., India, on the R. Gogra, which is here crossed by a bridge of boats. It trades in timber and furniture. Pop. 3000.

**Bahr-bela-Ma** (the waterless sea), valley in the Libyan desert, 50 m. W. of Cairo. It is 9 m. long, very deep, and dry and barren, but has been a watercourse. Some assert, on the strength of a passage in Herodotus, that a branch of the Nile once flowed here.

**Bahrain**, independent Arab state under Brit. protection. It was in treaty relations with the Gov. of India for over a century. It is a group of is. half-way up the Persian Gulf near the Arab coast (Al Hasa) and having a combined area of 213 sq. m. and a Moslem pop. of about 150,000. Manama, or B., is the largest is. of the group, lies at the mouth of B. Bay; it is 27 m. long by 10 m. wide, flat on the whole, but having in its centre a rocky hill, Jebel Dukhan. The chief tn. of B. is Manama (pop. 25,000). The next largest are Muharraq or Moharek, situated on a neighbouring smaller is., and Sirah. The whole group is fertile, producing rice, herbs, and fruit; fish are abundant, and the pearl fisheries of B. have been famous for centuries. The Bahrain (Brit.) Petroleum Co. have held a concession from the Gov. since 1930 and have an oil refinery at Manama. The yield is over 1,000,000 tons (metric) a year. The ruler is a sheikh, to whom is attached a Brit. adviser and a Brit. political agent. On B. itself there is an immense collection of huge sepulchral tumuli, enclosing tombs of limestone; some of these have been examined, and in them were found Phœnician relics. Religion, Muslim. The pop. of the is., numbering altogether 120,000, are a mixed race, mainly Persian and Arab.

**Bahrain Bay**, on the E. coast of Arabia, noted for its pearl fisheries.

**Bahr-el-Ablad**, or **White Nile**, riv. in Africa, rises from Lake Victoria, and is one of the chief branches of the main Nile. It is the Upper Nile, joined at Khartoum by the Bahr-el-Azrek. It flows through about 2300 m. of flat marshy country, and is fed by the trib. riv. Sobat on the E. and Bahr-el-Ghazal on the W.

**Bahr-el-Azrek**, or **Blue Nile**, rises near Lake Dembea, or Tsana, in Abyssinia, at an elevation of 7000 ft. It unites with the White Nile, Bahr-el-Ablad, at Khartoum. Its length is about

900 m., 500 of which are navigable at high water. In Abyssinia it is called Abai.

**Bahr-el-Ghazal:** 1. Trib. of the White Nile (or Bahr-el-Abiad), which it joins at Sobat. This riv. is responsible for the floating vegetation, called the *sudd* of the Nile. It gives its name to the dist. of Sudan through which it flows, formerly leased to the Congo Free State, but, since 1906, under the Brit. sphere of influence. 2. Riv. of the Sudan, which rises in the E. end of Lake Chad, and flows in a N.E. direction, until it spreads into the lagoon of the Bodele.

**Bai, Bais, or Baj, Tommaso** (1650-1714), It. tenor singer and composer, b. at Crevalcuore, near Bologna. He became master of the chapel of the Vatican. He is celebrated on account of his beautiful *Miserere*.

**Baise**, modern **Baja**, tn. in Campania, Italy, with grand ruins, 10 m. W. of Naples. In Rom. times it was a watering-place, with warm sulphur springs; it had baths and palatial residences, and was a favourite resort of the Cæsars. Nero built a villa here, and Hadrian d. in one that had belonged to Julius Cæsar. B. had from early times a reputation for immorality; Cicero once apologised for defending a man who had lived there. The most notable relics of antiquity are the temples of Venus, Mercury, and Diana.

**Baiburt**, tn. of Turkish Armenia, on the Tchoruk-See, about 65 m. W.N.W. of Erzerum. It has an imposing castle, and there are manufs. of carpets and cutlery. Pop. 10,000.

**Baidyabati**, tn. of Bengal, India, on the Hugli, opposite Barrackpur, and 15 m. N. of Calcutta. There are manufs. of jute and hemp rope. Pop. 30,500.

**Baie de Chaleurs**, see CHALEURS BAY.

**Baisersbronn**, tn. of Württemberg, Germany, in the region of the Black Forest, dist. Freudenstadt; pop. 6700.

**Bail (or Bayl), Jean Antoine de** (1532-1592), Fr. poet, b. at Venice. He studied with Ronsard under Daurat. He was a member of the Pleiade, and attempted to write Fr. verses with cadence and accent of Gk. and Lat. poetry. These verses he set to music, and in 1561 pub. *Twelve Hymns or Spiritual Songs*, and in 1578 sev. books of songs. He founded an 'Académie de poésie et de musique,' 1567-84, in Paris, which was the first of its kind. His poems were pub. in 2 vols., *Œuvres en rime* and *Les Jeux*, in 1573 at Paris, and consist of serious, comic, and sacred pieces. His *Poésies choisies* have been ed. by Beq de Fouquières, 1874, and his *Mimes, enseignements et proverbes* by Blanchemain, 1880. See M. Augé-Chibquet, *La Vie, les idées et l'œuvre de Jean Antoine de Bail* (Paris), 1909.

**Baikal**, fresh-water lake in Asia, situated in S. Siberia on the border of Irkutsk and Transbaikalia, called *Dai-lai-nor*, the holy sea, by the Mongols, and said to be the deepest lake in the world. It is 390 m. in length, and 20-50 m. in breadth, the area being 12,500 sq. m. The greatest depth is 4500 ft., the lake being 1513 ft. above sea-level. Its chief tribs. are the Selenga and Barguzin, and its outlet the

Lower Angara, a trib. of the Yenisei. There are many is., the largest of which is Olkhon. The lake is surrounded by the Baikalean Mts., a spur of the Altai. The fishing industry is important, the prin. fish caught being sturgeon and salmon. A fish called the golomyinka (q.r.) was once found in great quantities, but is now rare. Seals, too, are caught.

**Baikalean Mountains**, name sometimes applied to all the ranges which enclose Lake Baikal, Siberia, but properly belonging only to those on the W. side. They are about 500 m. in length, and average 3000 ft. in height. Granite and marble abound, and there is much iron ore; lapis lazuli is also found. The people of this region are the Buriats.

**Baikie, William Balfour** (1824-64), Scottish explorer and naturalist, was b. at Kirkwall, Orkney. Obtaining his M.D. degree at Edinburgh in 1848, he became a surgeon in the R.N., and in 1854 was appointed surgeon and naturalist to the *Pleiad* expedition, sent to explore the Niger. The chief officer dying, B. took command, and succeeded in going 250 m. further than any previous explorer, without losing another man. In 1857 he again went out in the *Pleiad*; the ship was wrecked on the Niger, and his party returned home, but he remained in the country, and single-handed laid the foundation of our present colony of Nigeria. He d. at Sierra Leone.

**Bail**. In law, when a person is charged with an offence he may be released on security given by one or more persons, usually householders, that he will appear at the trial. He is then on B., or in the B., i.e. custody, of the person giving B. or security. If he fails to appear, the B. is forfeited. If the sureties think the bailed person will not appear, they may surrender him, and be relieved of liability. A justice may now dispense with sureties and release the accused on his own recognisances if he be of opinion that justice will not be defeated. In felonies other than treason and in certain misdemeanours, the magistrate may in his discretion admit to B., but is not obliged to do so. In all other misdemeanours and in all summary cases the magistrate is bound to admit to B. In practice, however, B. is never allowed in a charge of murder, or in misdemeanours where the costs of prosecution may be allowed out of the co. rate. In treason it can only be granted by a judge of the king's bench div. or a secretary of state. The police may grant B. if, on arrest without warrant, the prisoner cannot be tried within 24 hours. In Scotland (Bail Act, 1888), murder and treason are the only non-bailable offences. The high court and the lord advocate can admit to B. In U.S. law B. is used to indicate either the bond which is furnished or the persons who bind themselves under penalty to see that the accused appears. Some state constitutions contain specific provisions as to the cases in which B. may be allowed; in other cases, the courts have a general discretion, subject to statutory regulations. Release on B. is the rule,

except in cases of murder or other capital charges. The amount of B. or penalty in the bond is fixed by the judge or court. The prohibition in the U.S. constitution of excessive B. is interpreted as a direction that B. shall not be refused in a proper case.

**Baildon**, tn. in the W. Riding of Yorkshire, England, 4 m. N. of Bradford, in the Otley div. There are sev. industries, including worsted mills and chemical works. Pop. 6500.

**Bailén**, or **Baylen**, tn. in the S. of Spain, 21 m. N. of Jaen. Here Dupont with 17,000 Fr. soldiers had to surrender to the Spaniards in 1808. B. is a mining centre. Pop. 8800.

**Bailey**, a prison or any modern structure situated where courts existed, as the Old B. in London. It formerly meant the courts of a castle formed by the spaces between the outward wall and the keep. In olden times it also meant the work, fenced with palisades or masonry, covering the outskirts of a tn. by way of defence.

**Bailey Bridge**, see under BRIDGING, MILITARY.

**Bailey**, **Liberty Hyde** (b. 1858), Amer. botanist and lecturer, b. at S. Haven, Michigan; educated at Michigan Agric. College and Wiscotau Univ.; dean of the College of Agriculture at Cornell Univ. Prof. of agriculture at Michigan Agric. College 1885-88; later, fellow of the American Academy of Arts and Sciences and the Botanic Society of America, and president of both in 1926. Among his works are *The Survival of the Unlike* (1896); *The Cyclopædia of Amer. Horticulture* (1900-2); *Botany* (1901); *Lessons with Plants* (1904); *The State and the Farmer* (1908); *The Apple Tree* (1922).

**Bailey**, **Nathan**, or **Nathaniel** (d. 1742), Eng. lexicographer and philologist. His *Dictionary Britannicum*, pub. in 1721, an improvement on previous lexicons, went through many eds., and was taken by Dr. Johnson as the basis of his dictionary 20 years later.

**Bailey**, **Old**, see OLD BAILEY.

**Bailey**, **Philip James** (1816-1902), was b. and educated at Nottingham. In 1835 he went to London, and entered Lincoln's Inn, but did not take up the legal profession in earnest. In 1839 he pub. his poem *Festus*, a version of the Faust legend. He continued to revise and enlarge it in successive eds. for the next 50 years. It has fallen into unmerited neglect, being a work of great imaginative power and lofty moral tone, but has faults in execution. B.'s later poems, *The Angel World* (1850), *The Mystic* (1855), *The Universal Hymn* (1867) were, comparatively, failures.

**Bailey**, **Samuel** (1791-1870), was the son of a Sheffield merchant, and for some years took an active share in business. A Liberal in politics, he twice contested Sheffield as a 'philosophic Radical,' but without success. His first book, *Essays on the Formation and Publication of Opinions*, appeared in 1821, and a sequel, *On the Pursuit of Truth*, in 1829. Other works were *Theory of Reasoning*, 1851, and

*Letters on the Philosophy of the Human Mind*, 1856-63. He also wrote sev. books on economics, the chief one being a *Critical Dissertation on Value*, 1825—an attack on Ricardo's theories.

**Baille**, or **Baillie**, superior officer or magistrate of a municipal corporation in Scotland. Bs. are invested with certain judicial and administrative authority within the city or burgh for which Bs. are appointed. They are assisted by a paid legal adviser called an assessor. The office is in some respects analogous to that of alderman in England, but unlike an Eng. alderman he retains his seat for the ward to which he has been appointed after selection as a B. The term of office is 3 years.

**Bailiff**, Eng. legal term signifying a superior steward or agent. The keeper of Dover Castle is called the king's B. The name now generally applies to the sheriff's officers. Such are either Bs. of hundreds or special Bs. The former are appointed by the sheriff to collect fines, summon juries, execute writs and processes, and attend at assizes and quarter sessions. The latter are men selected for their skill in hunting and apprehending persons liable to arrest. Being compelled to enter into an obligation for the due performance of their duties, they are sometimes called bound-bailiffs, or vulgarly bum-bailiffs. Special Bs. are appointed at the request of a suitor, and the sheriff is not responsible for what is done by them. A B. cannot lawfully act until he has received a warrant under the hand and seal of the sheriff. Bs. of a franchise or liberty are appointed by the lord of a liberty. They exercise jurisdiction in certain parts of the country, e.g. the liberty of Gower in Gloucestershire. The high B. of a co. court appoints sub-bailiffs who execute process of the court. His office is for life.

**Bailiwick**, legal term used with regard to the co. or dist. with which the sheriff, as bailiff of the king, has jurisdiction.

**Baillet**, **Adrien** (1649-1708), Fr. critic, b. at Neuville-au-Hez, near Beauvais in Picardy. He studied in a neighbouring convent, where he was introduced to the bishop of Beauvais, who assisted him in obtaining a good education. In 1676 he received holy orders and was given the vicarage of Lardières; in 1680 he became librarian to M. de Lamignon, the advocate-general. His *Les Enfants devenus célèbres par leurs études et par leurs écrits* (Paris, 2 vols., 1688) won popularity. His prin. work is *Jugements des savants sur les principaux ouvrages des auteurs* (1685-86). He also wrote a life of Descartes (1691) and various historical works.

**Bailleul**, tn. in arron. of Hazebrouck, dept. of Le Nord, France. It is an old Flemish tn. and has a museum of paintings and antiquities. The church of St. Vaast and the *hôtel de ville* date from the fourteenth and fifteenth centuries respectively. The chief industry is hand-made lace, and it has manufs. of woollens, lincens, cheese, earthenware, and soap. B. was in Ger. occupation and devastated during the First World War.

Retaken by the Brit. Aug. 30, 1818. Pop. 8000.

**Bailliage**, Fr. term, equivalent to bailiwick. The word was used in Switzerland of portions of ter. over which a bailiff was appointed. This officer was in charge of the police and had jurisdiction in certain civil and criminal cases. In case of maladministration, appeal lay to the cantons to which the B. belonged.

**Baillie, Lady Grizel (née Hume)** (1665-1746), Scottish poet, *b.* at Rebraes Castle, Berwickshire, daughter of the patriot, Sir Patrick Hume, first earl of Marchmont. In 1684 she supplied her father with food during his concealment in the vault of Polwarth church, and accompanied him when he fled abroad (1680-88). In 1692 she married the son of Robert B. of Jerviswood. Some of her ballads may be found in Allan Ramsay's *Tea-table Miscellany* (1724-27). The best known of her songs is *And werena my Heart licht I wad dee*. Memoirs of her and her husband were written by her daughter, Lady Grizel Murray of Stanhope (1693-1759).

**Baillie, Joanna** (1762-1851), Scottish poet and dramatist, *b.* at Bothwell, Lanarkshire, but went to live at Hampstead, where she *d.* The *Plays on the Passions* (1798-1836) are artificial in conception and lacking in dramatic incident, but they are written with vigour. *De Montfort* had a vogue through the acting of John Kemble and Mrs. Siddons. She is at her best in her songs and ballads written in the Scottish dialect.

**Baillie, Matthew** (1761-1823), Scottish lecturer on anatomy. Educated at Glasgow and Oxford Univs.; 1787, appointed physician to St. George's Hospital; 1789, fellow of the College of Physicians. After 1810 he acted as physician to the royal family. *The Morbid Anatomy of some of the most important Parts of the Human Body* (1795) influenced the study of medicine.

**Baillie, Robert** (1599-1662), Scottish Presbyterian divine. One of the commissioners appointed to prepare charges against Archbishop Laud, 1640. The first prof. of divinity at Glasgow Univ., 1642. Sat in the Westminster Assembly of Divines. Prin. of Glasgow Univ., 1661. His *Letters and Journals, 1637-62*, give an interesting picture of the times.

**Baillie, Robert**, of Jerviswood, Scottish patriot and martyr, who has been called the Scottish Algernon Sidney. He opposed the tyranny of Charles II.'s favourite, the duke of Lauderdale, in 1678, and was arrested on a charge of complicity in the Rye House plot and was unjustly condemned to death. Hanged at Edinburgh, Dec. 24, 1684.

**Baillon, Ernest Henri** (1827-95), Fr. botanist, *b.* at Calais, and *d.* in Paris. In 1864 he was appointed prof. of natural hist., and later prof. of hygiene, at the Industrial School of Art. Author of *Histoire des plantes*, 1866-85; *Traité de botanique médicale phanérogamique*, 1884, etc., and a botanical dictionary.

**Baillon, Guillaume**, see BAILLOU, GUILLAUME.

**Baillot, Pierre Marie François de Sales** (1771-1842), Fr. violinist. Studied music in Paris and Rome. He made his début in Paris in 1791, and was prof. of the violin in the Paris Conservatoire from 1795 till his death. He studied the theory of music under Catel, Reicha, and Cherubini. He entered Napoleon's private orchestra in 1802, and afterwards travelled in Russia with Lamare, 1805-8. In 1814 he organised concerts for chamber music in Paris with great success; toured in Holland, Belgium, and England, 1815-1816, and became a member of the London Philharmonic Society; director of the Paris Opera, 1821-31; and of the Royal Orchestra, 1825. B. belonged to the classical school of violin players, and won fame as a teacher. His compositions are difficult, and have been almost forgotten, but his *Art du Violon*, 1834, is still regarded as a standard work.

**Baillou, or Bailion, Guillaume** (otherwise Ballonius) (1538-1616), Fr. physician *b.* in Paris. Began by teaching the classics and philosophy in the univ. of Paris, and then studied medicine, taking his doctor's degree in 1570. His great merit lies in the fact that he rejected the 'specious and seductive' theories current in the doctrines of his day, preferring to follow on sound principles and to study the old physicians. B. was essentially the resuscitator of anct. medical studies, and particularly of the work of Hippocrates; and even if he did nothing on the speculative side at least he abstained from following the false route which depicts rather than explains, and realised the talent of the anct. scholars for observation. His outstanding work was his study in epidemiology, *Epidemiorum et ephemeridum libro quarto* (Paris) (1640), which revived the doctrine of Hippocrates in 'epidemic constitutions.' He thus gave the impulse to Sydenham who went still further in the doctrine. Another notable work was *Consiliorum medicinarum* ('synonymic' of the terms of Hippocrates). He is further remembered for being the first to differentiate between rheumatism and gout, and to describe arthritis, whooping cough, and many women's diseases. His works were collected and ed. by J. Thévat in Paris and, later, by Tronchin (1762).

**Bailly (or Bailly), David** (1584-1657), Dutch artist, *b.* at Leyden. He studied first under his father, Peter B., and was afterwards a pupil of Jacob de Gheyn. He travelled in Germany and Italy, returning to his native tn. in 1613, where he won a reputation as a portrait painter.

**Bailly, Jacques** (1629-82), Fr. painter, *b.* at Gracay (Cher). He settled in Paris and became a member of the Academy of Painting, in 1664. He etched 12 plates, representing bouquets of flowers, but is better known for his portraits in miniature.

**Bailly, Jean Sylvain** (1736-93), Fr. statesman, astronomer, and savant. In 1784 he was elected a member of the Fr. Academy, and in 1785 of the Academy of Inscriptions. In 1789 president of the Third Estate and of the National

**Assembly.** Mayor of Paris, 1789-91. He lost his popularity and went into retirement at Melun, where he was seized, brought to Paris, and executed in 1793 on a charge of conspiracy. 1775-87, *Histoire de l'astronomie*. Pub. posthumously *Essai sur l'origine des fables et des religions anciennes*, 1799; and *Mémoires d'un témoin*, 3 vols., 1821-22.

**Bailment**, term for the delivery of goods by the bailor to the recipient or bailee to be held according to the purpose of the delivery, and to be restored when the purpose is accomplished. B. is of 3 kinds: (1) For the benefit of the bailor or his representative. The bailee receives and keeps his deposit without reward, and is responsible only for gross neglect. (2) For the benefit of the bailee or his representative. The bailee receives a gratuitous loan, which he must return, without payment, at the end of a certain time. He is responsible in this case for the least neglect. (3) For the mutual benefit of the bailor and bailee or their respective representatives. This includes deposit as a security (as when goods are left with a pawnbroker, or when furniture is stored with a warehouseman), and the hiring of the use of a bailed article. The bailee is responsible only for ordinary neglect.

**Baily, Edward Hodges** (1788-1867), Eng. sculptor, b. at Bristol. Went to London in 1807 and entered Flaxman's studio. He was employed by George IV. to execute the sculpture in front of Buckingham Palace and the figures on the Marble Arch. He executed a number of busts and statues of public men, the Nelson monument in Trafalgar Square, Charles James Fox and Lord Mansfield in St. Stephen's Hall, Westminster. Among his finest works are: 'Eve at the Fountain,' 'Eve listening to the Voice,' 'Hercules casting Hylas into the Sea,' 'Psyche,' 'Girl preparing for the Bath,' and 'The Graces Seated.'

**Baily, Francis** (1774-1844), Eng. astronomer. In 1827 he was awarded the gold medal of the Astronomical Society for revising their Star Catalogue. He set on foot the reform of the *Nautical Almanac*, 1829; 1802, *Tables for the Purchasing and Renewing of Leases*; 1810, *The Doctrine of Life-Annuities and Assurances*.

**Baily's Beads**, the name given to a phenomenon which is observed in connection with the total eclipses of the sun, first fully described by Francis B. (q.v.). Owing to the effect of irradiation and the irregularity of the moon's edge, the crescent-shaped portion of the sun that is unobscured by the moon's disk looks like a belt of bright spots in a dark background, compared to a string of beads.

**Bain, Alexander** (1818-1903), Scottish psychologist and philosopher. Educated Marischal College, Aberdeen, 1836-40; became prof. of natural philosophy in the Andersonian Univ., Glasgow, 1845; secretary of the Board of Health, 1848-50. In 1860 he was appointed to the chair of logic in Aberdeen, and on his retirement was made lord rector of his own univ., 1881. He followed in the steps of Hartley, in that his psychology was based

on physiology, and he belonged to the experimental as opposed to the transcendental school. His prin. works are: *The Senses and the Intellect*, 1855; *The Emotions and the Will*, 1859; *Study of Character*, 1861; *Mental and Moral Science*, 1868; *Logic*, 1870; *Relation of Mind and Body*, 1873. In addition he assisted in the editing of Grote's *Aristotle* and ed. Grote's *Minor Works*; he wrote, in 1882, a biography of James Mill, as well as a criticism of J. S. Mill. His autobiography appeared in 1904.

**Bainbergs**, plate armour of the thirteenth century, to protect the legs.

**Bainbridge, Christopher** (c. 1464-1514), Eng. prelate. Bishop of Durham, 1507; archbishop of York, 1508. Henry VIII. sent him on an embassy to Pope Julius I., who appointed him cardinal of St. Praxed in 1611. He was poisoned by Rinaldo de Modena, a priest, who confessed that the bishop of Worcester had instigated him to perform the act.

**Bainbridge, John** (1582-1643), Eng. astronomer, b. at Ashby-de-la-Zouch, d. at Oxford. He was the first Savilian prof. of astronomy at the univ. of Oxford. He pub. *Astronomical Description of the Comet of 1618* (1619).

**Bainbridge, William** (1774-1835), Amer. naval officer, b. at Princeton, New Jersey. He entered the merchant marine service at the age of 15; became a lieutenant in command of schooner *Retaliation* in 1798; was captured off Guadeloupe by the Fr.; in 1800 he was promoted to the rank of captain, and was sent on an embassy to the dey of Algiers, who pressed him into Algerian service, under which flag he was compelled to go to Constantinople. When in command of the *Philadelphia* he captured the Moorish frigate *Mesboha* (1803), but was himself taken prisoner off Tripoli. He was appointed commodore in 1812, in command of the *Constitution*, *Hornet*, and *Essex*, and captured the Brit. frigate *Java*. From 1832 to 1835 he acted on the board of naval commissioners.

**Bainbrigg, Sir Philip** (1786-1862), Brit. general. He entered the Navy as a midshipman in 1799, but retired through ill health. In 1800 the duke of York appointed him to an ensigncy in the 20th Regiment; inspector of fortifications at Curacao, 1807; entered the senior dept. of the Royal Military College at High Wycombe, 1809, where he invented a projecting pocket sextant; deputy assistant quartermaster-general in Portugal, 1811. He took part with distinction in the Peninsular war and also served in France. He commanded the forces in Ceylon, 1852-54, and was promoted to the rank of lieutenant-general.

**Baines, Edward** (1774-1848), Eng. journalist and economist, b. at Walton-le-Dale, Lancashire. He was apprenticed to a printer first at Preston and then at Leeds; bought the *Leds Mercury* in 1801; M.P. for Leeds, 1834-41, as an independent Liberal. He advocated the reform of factory laws, Catholic emancipation, and opposed state interference in educational matters. He wrote a *History, Directory, and Gazetteer of the County of York*, 1823,

which was enlarged as the *History of the County Palatine and Duchy of Lancaster, 1668-70*; and a *History of the Reign of George III.*, 1823. See *Life*, 1859, by his son, Sir Edward B.

**Baines, Sir Edward** (1800-90), Eng. politician. Elected member of Parliament in 1859; he defended disestablishment of the Irish Church, opposed church tests in the univs., and introduced 2 franchise bills, in 1861 and 1864. Author of *History of the Cotton Manufacture in Great Britain*, 1853.

**Baines, Sir Frank** (1897-1933), an Eng. architect. Most of his professional career was passed in the Office of Works. Had much to do with the repair of old buildings of historic value. It was he, also, who set afoot the repair of the crumbling fabric of the Royal Palace of Westminster or Houses of Parliament. Resigned his official position to devote himself to private practice. Designed Chemical House and its companion building on the Thames Embankment. Repaired the historic roof of Westminster Hall. K.C.V.O. 1928.

**Baines, Peter Augustine** (1786-1843), Eng. prelate, b. at Kirkby, Lancashire. He was educated at the Eng. Benedictine abbey of Lambspring, Hanover, and entered the Benedictine order in 1804, and became a priest in 1810. He taught at Ampleforth till 1817, when he undertook the mission at Bath. He won a reputation as an eloquent preacher, and in 1823 he was appointed coadjutor-bishop to Collingridge, and in the same year was consecrated bishop of Siga. In 1829 he became vicar apostolic of the W. dist. of England; in this year he bought Prior Park, where he founded St. Peter's and St. Paul's, a lay and eccles. college respectively.

**Baini, Giuseppe** (1775-1844), It. priest, musical critic, and composer, b. and d. in Rome. He was appointed master of the pontifical chapel, and composed numerous musical works, of which the chief are a *Misereere* and the *Memorie storico-critiche della vita e delle opere di Giovanni Pierluigi da Palestrina*, 1828.

**Bains, vil.** in the dept. of Pyrénées-Orientales, France, 4 m. S.W. of Céret. Louis XIV. caused a fortress to be built here in 1670, at the foot of which are 2 mineral springs. The water is hot, and is collected in a reservoir, the descent to which is by steps. Over the bath and steps is an anct. vault. The building of this bath has been ascribed both to the Romans. and to the Moors.

**Bains, or Bains-les-Bains, vil.** in the dept. of Vosges, France, 16 m. S.S.W. of Epinal; it is frequented for its baths and warm springs (86-123° F.), which are recommended for cases of gout and diseases of the chest. Some anct. bronze medals, mostly Rom., but a few Gk., were discovered in 1752 under a large stone placed over one of the springs. Pop. 1850.

**Balocco, or Bajocco**, coin worth about a halfpenny, coined by the papal states, 1-100th part of the scudo = 4s. 3d.. so called from its brown colour.

**Bairaktar, or Balrak-dar** (1755-1808), title of Mustapha, grand vizier of Mahmud II. He was born of poor parents, and distinguished himself in military service. When pasha of Rustschuk, he fought against the Russians with some success, 1806. On hearing that the janizaries had murdered Selim III. and put Mustapha IV. on the throne, he marched to Constantinople, deposed Mustapha, and elevated his brother Mahmud II. to the throne, 1808. He was then appointed grand vizier. His policy was to strengthen the regular army and crush the power of the janizaries. However, his success was short-lived, for in the same year the janizaries revolted, seized the Seraglio, and demanded the restoration of Mustapha. At first he resisted, but seeing that he would soon be enveloped in flames, he strangled Mustapha and killed himself. The Turkish word B. means standard-bearer.

**Bairam, or Beiram**, name of 2 great Moslem feasts: 1. The Lesser B. is celebrated at the end of the fasting month Ramadan or Ramazan. It lasts from 1 to 3 days, and is marked by great rejoicings and the interchange of presents. 2. The Greater B. is held 70 days after the Lesser, and lasts for 4 days. It was instituted in commemoration of Abraham's sacrifice of Isaac. The faithful of Islam are expected to offer up a sheep, which is divided into three portions, one for the household, one for the relatives, and one for the poor.

**Baird, Sir David** (1757-1829), Scottish general, b. at Newbyth, Haddingtonshire. Entered the service, 1772; served in Brit. India, 1780-89. He was wounded while fighting against Hyder Ali at Pernambucum in 1780, and was taken prisoner and kept in a dungeon at Seringapatam for nearly four years. He took Pondicherry 1793. In 1799 he led the assault at Seringapatam, Col. Wellesley (afterwards duke of Wellington) being in command of the reserve. In 1801 he commanded an expedition to Egypt for the expulsion of the Fr. On his return to India he complained of the preference given to Wellesley, and asked for leave of absence. In 1804 he was knighted and made a K.C.B. Led an army to recapture the Cape of Good Hope from the Dutch settlers, 1806, and served at the siege of Copenhagen, 1807. In 1808 he was sent to the assistance of Sir John Moore with a reinforcement of 10,000 men, and distinguished himself at Corunna, 1809. In 1820 he was appointed commander-in-chief in Ireland, but was not successful as an administrator, and was removed from office in 1821, when Marquess Wellesley became lord-lieutenant.

**Baird, Dorothea** (Mrs. H. B. Irving) (1873-1933), Eng. actress, b. in Northumberland and educated at a high school in Hampstead. Joined Ben Greet's company, filling Shakespearian roles. But it was as the original Trilby in Sir Herbert Tree's production in 1895 that she made her name. Other parts, *Sophia*, in *Olivia*; *Acte*, in *Nero*; Mrs. Darling, in *Peter Pan*, and *Portia*.

**Baird, Henry Martyn** (1832-1906), Amer. historian, b. at Philadelphia, Pennsylvania; educated at Paris and Geneva, and graduated at New York Univ., 1850. Was a tutor at Princeton Univ., and from 1859 to his death prof. of Gk. at New York Univ. His best-known works are: *History of the Rise of the Huguenots of France* (1879); *The Huguenots and Henry of Navarre* (1886); *The Huguenots and the Revocation of the Edict of Nantes* (1895).

**Baird, Sir John Lawrence**, see **STONE-HAVEN, BARON**.

**Baird, John Lodie** (1888-1946), Scottish inventor of television, b. at Helensburgh, Scotland, the son of the minister of West Parish church; educated at Larchfield and the Royal Technical College, Glasgow. He undertook independent research at the early age of 18, when he set up a small laboratory at Hastings and devoted himself to the problem of 'seeing by wireless.' By 1924 he had designed an apparatus by which images could be transmitted in outline either by wire or by wireless. Two years later television was demonstrated by B. at the Royal Institution, showing the successful representation of images in detail with light and shade. In 1928 B. was the first man to demonstrate the possibilities of transatlantic television. In 1929 the Ger. post office was the first organisation to use B.'s system, and in the same year the Brit. Broadcasting Corporation began a television service, using his system. Television was subsequently improved by the development of the cathode-ray tube, and B. adopted this into his system (see **TELEVISION**). Further developments in television were interrupted by the outbreak of war in 1939. In Dec. 1941, however, B. showed for the first time television in relief and full natural colour. In that year he became technical adviser to Cable and Wireless Ltd., in which position he remained until his death at Bexhill on June 14, 1946. In addition to television, an earlier invention was the 'noctovisor,' which was designed by B. as a result of experimentation with infra-red rays. This instrument enabled visual impressions to be regarded in total darkness. At the time of his death B. was conducting experiments with a view to enabling audiences seated in cinemas to watch events, as they occurred, taking place at considerable distances away.

**Baird, Robert** (1798-1863), Amer. clergyman, reformer, and author. He was b. in Fayette co., Pennsylvania, and graduated from Jefferson College, 1818. He was agent and secretary of the Amer. and Foreign Christian Union, and worked in Europe on behalf of temperance and a revival of evangelical Protestantism. He wrote *A History of Temperance Societies in the United States*, 1836.

**Baird, Spencer Fullerton** (1823-87), Amer. naturalist. Graduated from Dickinson College, Carlisle, Pennsylvania, to which he was elected prof. of the natural sciences, 1845. He became assistant secretary of the Smithsonian Institution at Washington in 1850, and secretary in

1878. During this period the National Museum was organised and developed by him. In 1871 he was elected commissioner of fish and fisheries. He wrote numerous books on zoology and Amer. archaeology, the most important being: *Catalogue of North American Reptiles*, 1853; *Mammals of North America*, 1859; *Birds of America* (with John Cassin), 1860; *History of North American Birds* (with Dr. Brewer and Prof. Ridgeway), 1874-1884.

**Baireuth**, or **Bayreuth**, tn. in Bavaria, cap. of the dist. Upper Franconia, on the Red Main, 58 m. N.E. of Nuremberg by rail. It is famous for Wagner's theatre (1876), built especially for the performance of his operas. Among other interesting buildings are the palaces Fantasia and Hermitage. In the latter may be seen the apartments of Frederick the Great, and the room where his sister wrote her memoirs. There are also the houses of Wagner (Villa Wahnfried) and of Jean Paul Richter. The graves of Richter and Franz Liszt may be seen in the cemetery. The tn. was formerly the cap. of a margraviate, ruled by the house of Hohenzollern. The suburb of St. Georgen and the old tn. are industrial quarters, the textile industry before the Second World War having 300,000 spindles and over 4000 workers; there were also porcelain, machine, pianoforte, electrical, etc., manufs. Pop. 35,000. See *A. Bahr-Mildenburg, Bayreuth and the Wagner Theatre*, 1913.

**Bairnsdale**, tn. in Victoria, Australia, on the Mitchell R., 37 m. N.E. of Sale.

**Bairnsfather, Charles Bruce**, Eng. artist and journalist, b. at Murree in the Himalayas, 1887; eldest son of Maj. Thomas H. Bairnsfather; educated at United Services College, Westward Ho!; served in Warwickshire Militia, 1911-14. Engaged in civil engineering when war broke out; rejoined Warwickshire regiment, went to France Nov. 1914. From 1916, attached to War Office for work abroad. His humorous drawings of soldier life, at first a subject of official censure, estab. him the war caricaturist *par excellence*. Publications: *Fragments from France* (6 vols.), 1916, etc.; *The Beller 'Ole* (play); *Bullets and Bilets*, 1917; *From Mud to Mufti*, 1919; *Old Bill*, M.P. (play).

**Bairn's part of Gear**, see **LEGITIM**.

**Bairout**, see **BEIRUT**.

**Bairstow, Sir Edward Cuthbert** (1874-1946), Eng. organist and conductor, b. at Huddersfield. Served his articles to Sir Frederick Bridge at Westminster Abbey. Organist, Leeds par. church, 1906, and York Minster from 1913 till almost the end of his life. His publications are chiefly songs, and organ and church choral music.

**Baise**, or **Bayse**, one of the chief rivs. of the dept. of Gers, France. It is 145 m. in length, and flows from the Hautes-Pyrénées to the Garonne, which it joins at Alguillon.

**Baltul**, see **BERUL**.

**Baize**, coarse woollen cloth with a long nap. It was formerly made of a finer texture.

**Baj, Tommaso, see BAI, TOMMASO.**

**Baja**, cap. of co. of Bács, Hungary, trade in corn, cattle, and wine. Pop. 19,000.

**Bajan, see BEJAN.**

**Bajaur**, dist. on the borders of Pakistan, N.E. of Afghanistan, separated from Chitral on the W. by the Lahori Mts. It is a fertile plain, yielding iron ore.

youngest, Selim, and near Adrianople, on his way to exile, was taken into captivity. He is said to have d. at Aya, near Hassa, and some say he was poisoned by order of his son Selim. He was a generous ruler, but under the influence of the janizaries.

**Bajmond, see BAGIMOND'S ROLL.**

**Bajmok**, tn. in Yugoslavia, not far from Theresienstadt; pop. 9000.



Breitkopf & Härtel

#### THE THEATRE, BAIREUTH

The stage is set for the Grail scene in *Parsifal*.

**Bajazet, or Bayazid I. (1347-1403)**, son of Amurath I., on whose death at the battle of Kossovo he became sultan of the Turks. He was so active in warfare that he won the title Ilderim (lightning). He conquered Bulgaria and parts of Asia Minor, Serbia, Macedonia, and Thessaly. He blockaded Constantinople for 10 years, thinking to subdue it by famine. Sigismund of Hungary with a large army, officered by 2000 Fr. nobles, laid siege to Nikopol, but B. gained a decisive victory over the united forces of Fr., Poles, and Hungarians, 1396. He was, however, defeated in 1402 near Angora by Timur, who kept him prisoner till his death. The literary tradition that he was kept in a cage and fed with bits like a dog (cf. Marlowe's *Tamburlaine* and Rowe's *Tamerlane*) is without historical foundation.

**Bajazet, or Bayazid II. (1447-1512)**, Turkish sultan, son of Mohammed II. He ascended the Ottoman throne in 1481. During his reign he conquered Constantinople, and engaged in continuous warfare with his neighbours, particularly with Hungary, Poland, Persia, Venice, and Egypt. The last years of his reign were disturbed by the quarrels of his 3 sons about the succession to the throne. He finally abdicated in favour of his

**Baius, or De Bay, Michael (1513-89)**, Belgian theologian, b. at Melun; studied theology at Louvain, became prof. of scriptural interpretation at the univ. in 1552, and chancellor, 1575. He was deputy to the Council of Trent, 1563. At Louvain he was the leader of the Augustinian anti-scholastic school of theology. Plus II. condemned him in the bull *Ex omnibus afflictionibus*, 1567, for his teaching on justification by faith, sufficiency of the scriptures and grace, free will and original sin as applied to the immaculate conception. He was again condemned by Gregory XIII., 1579. His school came into conflict with the Jesuits, and later influenced Cornelius Jansen and Jansenism (q.v.). Collected works pub. 1696.

**Bajza, Joseph (1804-53)**, Hungarian poet and writer, born at Szécsi; contributed to *Aurora*, and succeeded Kisfaludy as editor, 1830; pub. a collection of his lyrics, 1835. He became director of the National Theatre at Pest, 1837. His historical writings include *Historical Library*, 1843-45; *Universal History*, 1847; and a translation of Dahlmann's *History of the English Revolution*. In 1848 he was editor of Kossuth's paper, *Kossuth Hirlapja*.

**Bakacs, Thomas (1442-1521)**, Hungarian cardinal and politician. He



became bishop of Győr and Eger, archbishop of Erzsébet, and cardinal and titular patriarch of Constantinople, 1510. He directed foreign policy under Michael Corvinus and Ladislaw II.; he failed in his candidature for the papacy in 1513; he declared an unsuccessful crusade against the Turks.

**Bakar, see BUCCARI.**

**Bakarganj**, dist., Dacca div., Bengal and Assam, India; area 5452 sq. m.; princ. tns. Barisal and Pirojpur; chief product, rice. It is situated on the delta of the Ganges and Brahmaputra; it is intersected by rivs., of which the chief are the Meghna, Arial Khan, and Harnighata. The forest tract of the Sundarbans lies along the coast. Pop. 2,700,000.

**Bakau**, or **Basau**, cap. of the dist. of the same name in Moldavia, Rumania, on the Bistritza, 50 m. W.S.W. of Jassy, and 188 m. N. of Bucharest by rail. It has a gymnasium, paper works, and some trade in agric. products. Pop. 20,000, of whom half were Jews before the Second World War.

**Bakchisarai**, or **Baktehissari** (Persian *bakhtcha*, orchard, garden; and *sarāi*, palace, inn). tn. in the Crimea, Russia, about 20 m. from Simferopol in the valley of Choruk. The anct. palace of the khans was built by Abdul-Sakhal-Geral in 1519, and restored in 1787 by order of Prince Potemkin. The tn. contains one long street of bazaars and booths; there are 36 mosques, 2 synagogues, and a Christian church. In one of the synagogues was found a very anct. parchment roll of the Bible which was subsequently placed in the Imperial Library. Leather articles, fur coats, soap, and candles are manufactured, and there is trade in tobacco and fruits. There is a mixed pop. (16,000) of Tatars, Russians, Gks., Armenians, and Karaites Jews.

**Bake, Jan** (1787-1864), Dutch classical scholar, b. at Leyden. Prof. of Rom. and Gk. literature for over 40 years in his native tn.

**Baked Shale, see PORCELLANITE.**

**Bakel**, fortified port and chief tn. of the B. dist., Senegal, Fr. W. Africa. It is situated on the Senegal R., 85 m. below Kayes, and about 550 m. above St. Louis on the coast. It is an important trading centre from the interior. Pop. 37,000.

**Bakelite**, substitute for celluloid, bone, ivory, etc. It is a carbon compound made from formaldehyde and phenol. B. was invented by the Belgian-Amer. chemist L. H. Baekeland (q.v.).

**Baker, Sir Benjamin** (1840-1907), Eng. civil engineer. He invented the pneumatic shield; designed, in conjunction with Sir John Fowler, the Forth Bridge, and assisted in the construction of the Nile reservoir.

**Baker, David** (1575-1641), Eng. Benedictine monk, b. in Monmouthshire; studied law; was converted to Catholicism, entered a monastery at Padua and joined the renewed Eng. congregation of Benedictines, 1619. He was spiritual director of an Eng. Benedictine convent at Cambrai, and was on a mission in England when he d. His valuable MS. collection

on eccles. hist. is in Jesus College, Oxford.

**Baker, George** (1540-1600), Eng. physician, a member of the Barber Surgeons' Company, and elected master in 1597. He was attached to the household of the earl of Oxford, and he wrote sev. works, which include: *The Neue Jewell of Health*, a translation of Conrad Gesner's *Euonymus*, with a preface, 1576; translations of Guldo's *Questions*, 1579, and Vlgio's *Chirurgical Works*, 1586; and *Antidotarie of Select Medicine*, 1579.

**Baker, Henry** (1698-1774), Eng. scientist and author, b. in London, was at one time a bookseller, but, in 1720, as tutor to a deaf girl, invented a system of teaching the deaf and dumb. He kept his methods secret, and estab. a profitable private school for deaf mutes. He helped Defoe in the *Universal Spectator*, 1728, and married his youngest daughter, Sophia, 1729. His scientific work was concerned with the microscope. He gained the Copley gold medal of the Royal Society for observations on the crystallisation of salts in 1744. He was made a fellow in 1740. He helped in the foundation of the Society of Arts, 1754, and by his will founded the Bakerian lecture of the Royal Society.

**Baker, Sir Herbert** (1862-1946), Eng. architect, educated at Tonbridge School. Trained at the Architectural Association and in the office of Arthur B., to whom he was articled. Later he was assistant to Sir E. George & Peto, among his colleagues being Edwin Lutyens and Guy Dawber. Meanwhile he studied at the architectural school of the Royal Academy where he won the Asplund prize of the R.I.B.A. in 1889. In 1892 he went to S. Africa, and after the Boer war designed many important buildings in that country. He built Groote Schuur for Cecil Rhodes, the administrative buildings for the S. African Gov. at Pretoria, the fine cathedrals of Cape Town, Pretoria, and of Salisbury, in Rhodesia. He designed Rhodes's tomb in the Matoppos, his memorial on Table Mt., and the Rhodes Hall at Oxford. He designed also the Kimberley siege memorial and the S. African Institute for Medical Research, and he may be said to have created the architectural character of S. Africa. This character combines effectively the ideals of the ruling race, as derived from anct. Rome, with different aspects of the local tradition of building, and in his later work, in India, he revealed the same ability to infuse local sentiment into the classical tradition. Through his friendship with Rhodes he had been able to visit Rome, Athens, Thebes, and Pæstum, and his work in S. Africa shows strongly the dominating influence of Mediterranean architecture. He was associated with Sir E. Lutyens in the designing of the new cap. at Delhi, the secretariat and the legislative buildings being his work. After the First World War he designed the memorials at Neuve-Chapelle and Delville Wood and, in England, the Winchester College war memorial and the Haileybury war

memorial hall. His chief work in London was the reconstruction of the Bank of England, a difficult task, which involved adherence to the style of Sir John Soane's original but with it an element of the present. In this work he made free use of painters, sculptors, and mosaic designers. India House, Aldwych, is a conspicuous example of his ability to introduce a special atmosphere into classic design. Other works: S. Africa House, in Trafalgar Square; Glyn, Mills's bank in Lombard Street; the building of the Royal Empire Society in Northumberland Avenue; and Church House, Westminster. He was knighted in 1926; K.C.I.E., 1930; R.A., 1932. His memoirs, under the title *Architecture and Personalities*, were pub. in 1945.

**Baker, John Gilbert** (1834-1920), Eng. botanist, b. Guisborough, Yorkshire; became in 1886 first assistant at the herbarium of the Royal Gardens, Kew, and keeper 1890-99. He was Victoria medalist of the Royal Horticult. Society, 1897, and gold medalist of the Linnean Society, 1899. He was associate editor of the *Journal of Botany*, and pub. botanical works, of which the most important are: *Synopsis Filicum*, 1883 (begun with Sir W. J. Hooker); *Flora of the Mauritius*, 1877; *Flora of the English Lake District*, 1885; *Handbooks of the Fern Allies*, 1887; *Amaryllidaceae*, 1888; *Bromelidaceae*, 1889.

**Baker, Josephine Turek** (1861-1942), Amer. author. Founded the *Correct English Magazine*, 1899; president and founder of the International Society for Universal Eng. Publications: *Correct English*, and other similar works; also *Songs of Triumph*, 1933, and 4 plays, including a drama on Madame de Staël.

**Baker, Newton Diehl** (b. 1871), Amer. politician, b. at Martinsburg, W. Virginia. Educated Johns Hopkins and Washington and Lee Univs. Practised law for a time at Martinsburg, then moved to Cleveland, Ohio, where he became city solicitor. President Wilson in 1916 appointed him secretary for war. A little over a year later, when the U.S.A. entered the First World War, B. and Wilson decided to adopt conscription almost immediately. The measure was bitterly fought in Congress; nevertheless the law was enacted. B., with Gen. Crowder, devised the machinery whereby the entire war man-power of the nation, between the ages of 18 and 45, was enrolled for service if necessary. So successful were the training camps that B. devised with his military aides that when the war closed the U.S.A. had some two million soldiers in France and Flanders, with over two million more in Amer. training camps, waiting to be sent if required. B. left office in 1921, when President Wilson's second term came to an end. He was appointed by President Coolidge in 1928 as an Amer. member of the Court of International Justice at The Hague, and in the same year was elected president of the Woodrow Wilson Foundation.

**Baker, Ray Stannard** (1870-1946), Amer. author. Studied law and literature, Michigan Univ. Became managing

editor of McClure's Syndicate, 1897-1898; appointed to the special commission of the Dept. of State in Great Britain, France, and Italy during the last year of the First World War. Among his numerous publications are: *The Spiritual Unrest*, 1910; *What Wilson did at Paris*, 1919; *Woodrow Wilson and World Settlement—a History of the Peace Conference* (3 vols.), 1922. With Prof. E. W. Dodd, ed. *The Public Papers of Woodrow Wilson* (6 vols.). Under the pseudonym of David Grayson: *Adventures in Contentment*, 1907; *The Friendly Road*, 1913; *Hempfield*, 1916; *Adventures in Understanding*, 1925; *Adventures in Solitude*, 1932; *The Countryman's Year*, 1936.

**Baker, Sir Richard** (1568-1644), author of the once-popular *Chronicle of the Kings of England*, which, we learn from Addison's *Spectator* (269 329) and Fielding's *Joseph Andrews*, was the favourite hist. of the country squires. He was M.P. for Arundel and E. Grinstead, and knighted 1603. He lost all his property, and was confined in the Fleet prison 1635, where he wrote his hist. and d.

**Baker, Sir Samuel White** (1821-93), Brit. explorer, was intended for business by his father, a W. India merchant, and went to Mauritius, and in 1846 to Ceylon, where he founded an agric. settlement. He travelled in Asia Minor and E. Europe, and in 1861 started on his explorations of the Nile basin which made him famous. He first explored the Athara and Ea tribes of the Nile. In 1862 he met Speke and Grant at Gondokoro returning from the discovery of Victoria Nyanza and the main sources of the Nile. With their information B. discovered Albert Nyanza, 1864, through which he proved the Nile passed, and the Murchison Falls of the Victoria and Nile, returned to Khartoum, 1865. He was given the gold medal of the Royal Geographical Society, and was knighted, 1866. In 1870 the Khedive Ismail appointed him governor-general of the Nile equatorial dists. for four years to suppress the slave trade and open up the country for trade. Many difficulties prevented his success, but he laid the foundations for Gen. Gordon, his successor. His second wife (married 1861), a Hungarian, Florence von Sass, accompanied him on all his travels. His publications include *The Albert Nyanza and the Exploration of the Nile*, 1866; *Nile Tributaries of Abyssinia*, 1867; *Ismaïlia*, 1874; *Wild Beasts and their Ways*, 1890.

**Baker, Thomas** (1656-1740), Eng. antiquary, b. at Lanchester, Durham; was educated at St. John's, Cambridge, of which he was a fellow. He refused to read James II.'s Declaration of Indulgence, and lost his living in 1690 as a non-juror, and in 1717 his fellowship. He left his MSS. on the hist. of Cambridge Univ. to the Brit. Museum and the Univ.

**Baker, Sir Thomas DuRand** (1837-93), Brit. officer. He obtained a commission as ensign in the 18th Royal Irish foot regiment in 1854. He served in the Crimean war, 1854-56. In 1857 his regiment was ordered to Central India, where he took part in the pursuit of

**Tantia Topi**, 1858. He was appointed quartermaster-general in the Ashanti expedition, 1873-74; assistant-adjutant-general in London, 1875; aide-de-camp to Queen Victoria, 1877. During the Russo-Turkish war he took part in the operations, being attached to the Russian Army; in 1848, he was sent to India as military secretary to the governor-general, Lord Lytton; he accompanied Sir Frederick (afterwards Earl) Roberts in the advance on Kabul, 1879-80. He was made lieutenant-general in 1891, and *d.* at Pnn.

**Baker, Valentine** (1827-87), also known as **B. Pasha**, Eng. soldier, brother of Sir Samuel White B. Entered the army in 1858; served in the Kaffir war, 1852-53; promoted to colonel of the 10th Hussars, 1860; explored the N.E. frontier of Persia, 1873; entered the service of the sultan, 1877; and became a major-general in the Turkish Army. He took part in the Russo-Turkish war; organised the Egyptian Army for the khedive, 1882-87, and was defeated by Osman Digna at El Teh, near Tokar, in 1884. On his return to England he joined the staff of Gen. Wolseley, 1885, but his application to re-join the Brit. Army was refused. Two years later he returned to Egypt and *d.* at Tel-el-Kehir. Author of *Clouds in the East*, 1876, and *The War in Bulgaria*, 2 vols., 1879.

**Baker City**, co. seat of B. co., Oregon, U.S.A., on the Powder R., on the Oregon railroad and Navigation Company's and Sumter Valley railroads. It is the centre of a gold- and silver-mining dist. The chief industries are agriculture, lumbering, and the manuf. of carriages. There are also breweries, brickyards, and planing mills. Pop. 9,300.

**Baker Mount**, a volcanic mt., 10,827 ft. in height, belonging to the Cascade Range in Whatcom co., Washington, U.S.A.

**Bakersfield**, the co. seat of Kern co., California, on the Kern R., and on the S. Pacific and the Atchison, Topeka, and Santa Fé railroads. It is a stock-raising and fruit-growing dist., and there are machinery works, foundries, oil refineries, planing and flour mills. The chief exports are live-stock, wool, hides, and agric. products. Pop. 29,280.

**Bakewell**, tn. in Derbyshire, England, on the R. Wye, 25 m. from Derby. The scenery of the dist. is beautiful; near by are Haddon Hall and Chatsworth. There are Saxon remains on Castle Hill; the church of St. Anne is mentioned in Domesday; on its S. side stands an eighth-century carved stone cross. Lead-mining was practised from early times, and zinc and marble are still worked. The almshouse dates from 1602, the grammar school from 1637. Pop. 3100.

**Bakewell, Robert** (1725-95), Eng. agriculturist, *b.* at Dishley, Leicestershire, England; he devoted himself to the breeding of live-stock; his new long-wool 'Leicester' sheep and the 'Dishley long-horn' cattle became famous. See **CATTLE**.

**Baking**, method of cooking in which food is cooked in a heated oven; the term is also used in connection with the making

of pottery (*q.v.*) and bricks (*q.v.*). The chem. of the process is explained in the article on cookery (*q.v.*).

**Baking Powder**, substitute for yeast composed of a mixture of tartaric acid and bicarbonate of soda, a quantity of flour usually being added to reduce the strength. When the powder comes in contact with water, carbonic acid gas is set free by the decomposition of the carbonate. The evolution of this gas when the powder is kneaded up with dough produces the porosity which is required to make the bread light.

**Bakninh**, see **BACNINH**.

**Bakony Wald**, mt. range in Hungary, N. of Lake Balaton and S.W. of Budapest. It forms the outlying E. portion of the Alps, and is separated from the Carpathian system by the Danube. The N.E. portion is known as the Vertes Mts. and Pelis Mts. (highest point 2476 ft.). Up the S.W. portion, the B. W. proper, the highest peak is Köröshegy, 2320 ft. The forests were the haunt of the robbers of Hungarian folk-song.

**Bakshish** (Persian, from *bakhshidan*, to give), word meaning a gift, and used in the Moslem E. of petty almsgiving. For European travellers it embraces the large or small gifts necessary in the E. to procure any service, hence equivalent to 'tip.'

**Bakst, Leon** (1866-1924), Russian painter; *b.* probably at St. Petersburg (Leningrad), where he passed his earliest years. One of his grandfathers having been a society Parisian in Napoleon III.'s time, the home in which Leon was brought up was full of decorations of the Second-Empire period—so well reproduced by him later. He attended the Imperial Academy of Arts; but left after displeasing the authorities there by his painting of a 'Madonna Weeping over Christ,' in which all the figures were Jewish. He was employed to teach the children of the grand duke Vladimir—afterwards his patron in theatrical matters. Visited Paris at beginning of Franco-Russian entente; returning to Russia, he became scene-painter, first to the Hermitage Theatre and then to the Imperial Theatres. He helped the movement for reviving native Russian art, as opposed to Germanised fashions. He was also active in restoring the antique beauty of presentment of the drama of ant. Greece. In the autumn of 1906, exhibited in Paris; in 1908 became famous as the scene-painter of Diaghilev's Russian ballets. Returned to Russia in 1922; but afterwards resumed residence at Paris, and *d.* there. Life by A. Levinson, 1923.

**Bakhtissari**, see **BAKHCHISARAI**.

**Baku**, formerly a gov. of Transcaucasia, but, since the First World War, a prov. of Azerbaijan (*q.v.*); bounded E. by the Caspian Sea, N. and W. by Daghestan and Ganja (Elisavetpol), and S. by Persia, area, 15,061 sq. m.; pop. before 1914, about a million. The chief tns. are B. (see below), Geokchai, Kuba, Lenkoran and Shemakha. B. includes the fertile and wooded slopes N. and S. of the E. Caucasus, the Kuba plain N. of that range, and the Kura and Aras steppes to the S.

The railway lines are run from B. to the Beslan-Vladikavkaz junction *via* Derbent along the Caspian Sea (400 m.), and from B. to Batum *via* Tiflis along the Kura valley (560 m.). It is linked with Moscow by rail *via* Rostov. The arid Apsheron peninsula is the seat of the great oil-fields, which lie round the tn. of B.; these include Balakhani, Bibi Eybat, the 'black tn.', and the 'white tn.'. The output, amounting to some 5000 tons only in 1863, yields about 6-10 million tons annually. The outbreak in 1905 of the racial feuds between Tatars and Armenians, and the general civil disorders of the period, reduced B. to anarchy and large areas of the oil-fields were burned. A steady recovery ensued, and the output reached a normal level by 1909. The refined oil, petroleum, is mainly conveyed by pipelines to Batum, on the Black Sea, for export; the heavier crude oil, naphtha, used for fuel and lubricants, is conveyed by tank-cars. The prin. tn., B., cap. of the prov., lies to S. of the Apsheron peninsula, on the Caspian. It is an important harbour for the Transcaspien trade, and was the chief station of the Caspian naval flotilla. Pop. (1939) 809,000. The new tn. lies on the W., the old tn., still retaining its oriental look, is to the E. The tn. is mentioned by Masudi, the Arabian historian, in the tenth century, and the eleventh-century mosque of the Persian shahs still remains. B. belonged to Persia till its capture by the Russians in 1735; it became part of the Russian empire in 1806. The Parsee fire-worshippers had a holy shrine and sacred place at Surakhani, 13 m. E. of the tn. During the First World War the collapse of Russia led to revolutions and counter-revolutions of 'Reds' and 'Whites' in S. Russia, which the beaten army of Turkey exploited to its advantage. A Brit. military mission under Gen. Dunsterville was sent from Bagdad to advise and assist the Armenians in B. in August 1918, but had to withdraw a month later owing to lack of local support. The oil resources of B. were threatened by the Ger. invasion of the Caucasus in the summer of 1942. By the end of July the Gers. were 700 m. away, and were soon rapidly pushing forward along the Rostov-B. railway. But the prospect of their reaching the S. Caucasus for a drive on B. was still remote when the ice and snow of early winter closed down on the high mt. passes. The beginning of Oct. saw the Gers. still 50 m. from Grozny, and the great prize of B. appeared to be more than ever out of reach. The great defence of Stalingrad in that month soon hindered the Gers. from throwing their main weight into a determined advance on B., and by Jan. of the following year Gen. Maslennikov's forces had advanced 200 m. from Ordzhonikidze along the Rostov-B. railway, and thereafter B. was safe.

**Bakunin, Mikhail** (1814-76), Russian anarchist and revolutionary, was *b.* at Tajok, Russia, of a noble family. He resigned his commission in the Imperial Guard, and in 1846 met Proudhon, the founder of anarchism, in Paris. Expelled

from France in 1848, he shared in the Dresden revolution and was sentenced to death. The sentence was commuted, and he was later handed over to the Russian authorities and exiled to Siberia, 1855. He escaped in 1861, and spent the rest of his life chiefly in Switzerland. He joined the International in 1869, becoming the leader of the more violent Lat. section, styling themselves federalists or anarchists as opposed to the political socialists under Marx. His attacks on his opponents at The Hague Congress of the International, 1872, led to the expulsion of B. and the anarchists. He *d.* in Bern. His best-known work is *Dieu et l'État*; his complete works were pub. in 1905. See **THIRD INTERNATIONAL**. See also E. H. Carr, *Michael Bakunin*, 1937.

**Bala**, tn., Merionethshire, N. Wales. The prin. industry is stocking and flannel manuf. B. College is the N. theological college of the Calvinistic Methodists. B. Lake (Llyn Tegid), 4 m. long by  $\frac{1}{2}$  wide, is the largest in Wales. Pop. 1405.

**Balaam**, son of Beor, a prophet of the O.T. (Num. xxii., xxiii.), who is recognised as inspired by God, although not of Heb. race. In other parts of the Bible, e.g. 2 Pet. ii. 15, Rev. ii. 14, he is reprobated as one of those who love the 'wages of unrighteousness.' Balak, king of Moab, alarmed at the defeat of the Amorites and Bashan by Moses and the Israelites, sends twice with promises of reward to summon B. from Pethor on the riv., i.e. Euphrates. Forbidden at first, he is commanded to go, but only to speak the words God shall put into his mouth. On his journey occurs the incident of the angel and the speaking ass. Three times B.'s curses are turned to blessings, at the high places of Baal, on Pisgah, and on Peor. These blessings take the form of 7 poems: (1) Num. xxiii. 7-10, the power of Israel; (2) and (3) xxiii. 18-24, xxiv. 3-9, the coming monarchy; (4) xxiv. 15-19, the rise of the star and sceptre out of Jacob; (5), (6), and (7) xx.-xxiv. the doom of Amalek, conquest of the Kenites by Assyria, the ships from the W., Chittim (Cyprus), to overthrow Assyria. The last 3 poems are considered a later addition by modern critics, who trace 2 distinct versions in the story of Numbers. B. is slain in the punishment inflicted on Moab (Joshua xiii. 22).

**Balachong**, Chinese condiment made of putrid shrimps or small fish pounded with spices and salt and then dried and eaten with rice.

**Balaclava**, see **BALAKLAVA**.

**Balad**, see **BELED**.

**Balaena**, see **RIGHT WHALE**.

**Balaeniceps** (Lat. *balaena*, whale, *caput*, head), shoebill, a genus of the family Ardeidae, which includes herons and bitterns, and it is allied to the storks and flamingos. It lives in the marshes of the Upper Nile and feeds on fish, lizards, and other reptiles. It has a peculiar, large, boat-shaped beak. *B. rex* is the only species known.

**Balaenoptera** (Lat. *balaena*, whale, Gk. *πτερόν*, wing), name given by Lacépède to the fin-whales (*q.v.*).

**Balaghat**, dist. of the Nagpur div. of the Central Provs. of India; area 3132 sq. m.; pop. 511,600. The chief tn. is Burha.

**Balaguer**, Victor (1824-1901), Sp. poet, historian, and politician, was b. at Barcelona, and d. at Madrid. In 1854 he was appointed keeper of the archives at Barcelona, and afterwards prof. of hist. Among his most important works may be mentioned *Trovador de Montserrat*, 1850; *Primavera del último trovador catalán*, 1876; *Don Juan de Serralonga*, 5th ed., 1875; *Historia política y literaria de los trovadores*, 1878.

**Balakhissar**, see **BALIKESIR**.

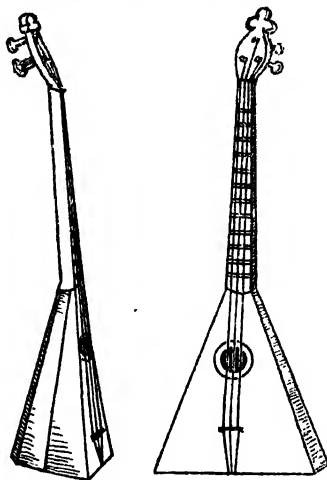
**Balakhna**, or **Balachna**, one of the circles of the prov. of Nijni-Novgorod (now Gorky), Russia, situated principally on the r. b. of the Volga. The land is cultivated and produces crops of flax, hemp, and corn. The chief tn., of the same name, is about 20 m. N.W. of Nijni-Novgorod, on the r. b. of the Volga, where it is joined by the Ussla. The wooden walls and towers which once surrounded it were destroyed by fire in 1730. There is traffic in grains, linens, and other manufs., and barges are built for the navigation of the Volga. Pop. 6000.

**Balakirev**, Mily. Alexeevitch (1837-1910), Russian musical composer, b. in Nijni-Novgorod. He was the acknowledged leader of the Russian 'Nationalist' school of the fifties, and carried on the tradition of Glinka. It was in 1861 that he began to attract around him promising musicians like Borodin (*q.v.*), Mussorgsky (*q.v.*), and, later, Rimsky-Korsakov (*q.v.*), and on all of them he exercised great influence, and also upon composers who were not his pupils, such as Tchaikovsky. In 1869 he became conductor of the Imperial Russian Musical Society. In 1881, after some years of seclusion he returned to St. Petersburg with his masterpiece *Tamara*. As a composer B. is original, even though he reveals the influence not only of Glinka, but also of Chopin, Liszt, Schumann and, to a lesser degree, of Berlioz. D. in St. Petersburg.

**Balaklava**, or **Balaclava**, tn. in the S.W. of the Crimea, on the Black Sea, about 6 m. from the harbour of Sebastopol. The harbour is excellent, having a narrow entrance, and being sheltered by lofty hills. It is the Portus Cymbolorum of the ancients, a port at which Ulysses is said to have touched. An accurate and graphic description of the bay is given by Homer. It was for long a Gk. colony; in the fourteenth century it fell into the hands of the Genoese, who called it Bella Cala, or Cembala. The Genoese settlers were expelled by the Turks in the fifteenth century. Catherine of Russia made it into a military station. In 1854-56 the tn. was held by the Brit. An engagement was fought between the Eng. and the Russians on the heights between B. and Tchernaya, when the famous charge of the Light Brigade (Six Hundred) was made on the Russian guns. Pop. 2000. See *Kinglake, Invasion of the Crimea*, 1863-1887 (vol. IV.).

**Balalaika**, a form of the guitar common

in Russia, where it is used by the peasants to accompany popular songs. It has a triangular body, and usually 3 strings, and is made in various sizes.



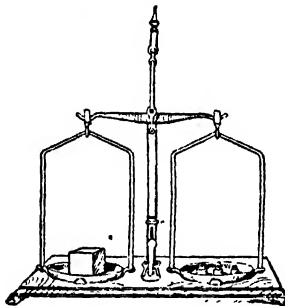
BALALAIKA

**Balance** (Lat. *bi-*, twice, *lanx*, a dish), instrument for determining the weight of a body. The application of the term is extended to any condition of equilibrium, as in B. of power (*q.v.*), and also to the excess of one quantity over another, or the quantity necessary to establish equilibrium, as in B. of trade (*q.v.*), and the credit or debit B. in a book-keeping account.

The common B. consists essentially of a beam resting at its middle point upon a fulcrum and furnished at its extremities with 2 scale pans; the goods to be weighed are placed in one of these, and known weights placed in the other until the beam assumes a horizontal position. The B. thus constitutes a lever of the first class, the condition of equilibrium being established by the force rotating the beam in one direction being counteracted by an exactly equal force tending to rotate the beam in an opposite direction. In order that the B. should give a true result, the following conditions must exist: (1) The two arms of the beam must be precisely equal in length, otherwise a weight depending from the end of the shorter arm will be balanced by a smaller weight on the longer arm, as in the steelyard. A sufficient test is provided by placing weights in the two pans until the beam is horizontal and then interchanging the weights, when the beam should become horizontal again. (2) The B. should be in equilibrium when the scales are empty. This does not necessarily mean that the arms are equal, for unequal arms may be compensated for by pans of unequal

weight; this condition would give an incorrect result, a weight in the lighter pan on the longer arm having more additional turning power than an equal weight in the heavier pan on the shorter arm. (3) The centre of gravity of the beam and pans should be in the same vertical line as the fulcrum when the beam is horizontal, and should be a little below the fulcrum, otherwise the slightest displacement would result in the beam toppling right over.

A B. is said to be delicate, sensible, or sensitive when a small additional weight in one pan causes an appreciable rotatory movement of the beam, that is, when the angle moved through by the beam is large for a small difference in the weights at either end. Delicacy may be obtained by attention to the following points: (1) The arms of the B. should be made as long as is consistent with lightness and rigidity, for the longer the arm is, the greater will be the turning power of a small weight.



THE COMMON BALANCE

(2) The weight of the beam should be as small as is consistent with rigidity, for the amount of rotation should depend as much as possible on the weight in the pan, or, in other words, the weight in the pan should be the greatest possible proportion of the total weight tending to turn the beam about its fulcrum. These two conditions are often met by making the beam of aluminium and constructing it so that it is capable of bearing the greatest strain without bending in a vertical direction. (3) The centre of gravity of the beam should be brought a very little below the point of support, so that the weight of the machine should tend as little as possible to keep the beam in a horizontal position. (4) Friction should be reduced to a minimum. To effect this, the edges from which the beam and pans are supported are made as sharp and as hard as possible, and the surfaces on which they rest as smooth and as hard as possible. The edges are therefore often made of agate and the surfaces of polished steel. Additional delicacy is imparted to the machine by the use of a long vertical pointer attached to the middle of the beam, the slightest deflection of which causes a considerable arc to be described by the end of the pointer.

It is sometimes necessary that a B. should be stable, that is, that the beam should return as quickly as possible to the horizontal position after deflection. To effect this, it is necessary that the centre of gravity of the beam and pans should be some distance below the fulcrum, so that when the beam is deflected, and the centre of gravity therefore no longer vertically beneath the fulcrum, the weight of the machine will operate in bringing the B. to rest again. This condition is the reverse of that required for sensibility, so that the properties of stability and sensibility are in some degree incompatible. In commerce, where quickness of weighing is desirable, stability is aimed at; whilst in physical and chemical research, where accuracy is of prime importance, the centre of gravity of the B. is brought close to the fulcrum. In the delicate Bs. used for chemical analysis, the distance of the centre of gravity from the fulcrum can be regulated within small limits by the use of a screw on the beam vertically above the fulcrum, turning the screw so that it rises, bringing the centre of gravity nearer the fulcrum, and vice versa. Such Bs. are protected from air currents, dust, etc., by being enclosed in glass cases, with sliding fronts. Strong sulphuric acid, caustic potash, or some other dehydrating substance is usually exposed in dishes to absorb moisture from the air. The wearing of the parts in a chemical B. is obviated by allowing the beam and pans to rest on suitable supports when not in use, the knife-edges being brought into contact with their surfaces by moving a screw in front of the instrument. A graduated scale behind the pointer renders it unnecessary to wait for the B. to come to rest at each weighing, as equal deflections either side are quite sufficient to indicate equal weights. A small 'rider,' or movable piece of wire, can be used to bring the B. into equilibrium when the difference in weights is very small; the rider is moved along the beam towards its extremity over small graduations, the motion over one graduation being generally equivalent to an additional weight of one-hundredth of a grain.

Even if a B. be not accurate in itself, a good result may be obtained by double weighing. The body to be weighed is placed in one pan and shot or sand is poured into the other until the beam is horizontal. The body is then taken off and known weights are placed in the pan until the beam is again horizontal. The result will be accurate even if one of the pans is loaded. Another method consists in placing the body to be weighed in the two pans successively and obtaining two results. If the fault of the B. is that it has unequal arms, the true weight will be the geometrical mean of the apparent weights, but if the B. is false through the pans being unjustly loaded, the true weight will be the arithmetical mean of the apparent weights.

*Roberval's B.* consists of four rods hinged smoothly in the form of a parallelogram. In its position at rest the rods form a rectangle, the weight pans being

firmly fixed to the vertical rods, and the horizontal rods free to turn about their middle points, which are supported by fixed vertical uprights. Whatever movement takes place, the four movable rods form a parallelogram, those supporting the weight pans always being vertical. The vertical work done in displacing one of the pans downwards is therefore always equal and opposite to the virtual work done in displacing the other, no matter on what parts of the platforms the weights may be placed. This form of B. is commonly used for weighing letters and parcels.

*Beranger's B.* is at first appearance much more complicated than Roberval's B.; but in reality is not so. The principle of placing the pans above the beam is retained, but all loads on the pans are transferred to subsidiary beams arranged below the main beam, which, in their turn, transmit a pull, always vertical and equal to the load, to the sharp edges of the main beam, and, by this means, the intervention of lateral forces is avoided.

*The common or Rom. steelyard* is a lever of the first class, but equilibrium is obtained by varying the distance of the weight from the fulcrum instead of varying the weight. It consists of a beam movable about a fulcrum near the end, from which is suspended the body to be weighed. A movable weight is slid along the long arm until the beam balances horizontally. Graduations on the long arm indicate the weight.

*The Dan. steelyard* consists of a bar with a heavy knob at one end and a hook at the other from which the body to be weighed is suspended. In this case the fulcrum is movable, and usually consists of a loop of string, its position with respect to graduations on the bar indicating the weight of the body.

*The bent lever B.* consists of a lever of unequal arms, the lighter of which ends in a pan to receive letters or small parcels. The other arm is bent downwards and weighted, and moves in front of a graduated arc. The nearer the weighted arm is to the horizontal position the greater is its turning power, as the weight acts at a greater distance from the fulcrum. Therefore the weight of the body placed in the pan is determined by the extent to which it lifts the weighted arm. The instrument is generally graduated empirically.

*The spring B.* consists of a steel wire wound in the form of a spiral, and usually enclosed in a cylindrical case with a slot through which the spring is attached to a pointer moving along a vertical scale. The body to be weighed is suspended by a hook, or placed in a pan attached to the bottom of the spring, and the weight is indicated by the amount of stretching that the spring undergoes. The elasticity of the spring varies with time and use, and as it is used directly against the force of gravity, the readings of such an instrument vary in different parts of the world.

*The torsion B.* consists of a fine wire clamped at one end and carrying an index swinging in a horizontal plane at the other. The angle through which the index is

twisted is proportional to the force causing the torsion. The index is usually a magnetic needle, and the instrument is used to measure the force of magnetic attraction and repulsion.

**Balance of Power**, in diplomacy, the principle of maintaining an equilibrium between states or groups of states so that no single state or group becomes overwhelmingly powerful, or able to dictate to others. In diplomatic relations the principle of the B. of P. has operated, though not stated in actual words, from the earliest times, e.g. in the leagues of the Gk. city states; the maze of wars and alliance of the It. republics; or the attempt of Wolsey and Henry VIII. to make England the balancing power in Europe. In the seventeenth and eighteenth centuries, the B. of P. was recognised as a definite formula of diplomacy. It was the guiding principle of William III. in his lifelong struggle against Louis XIV. It explains the tangled diplomacy and constant wars of the eighteenth century, culminating in the coalition of all the powers against Napoleon. Canning's famous remark, 'I called the New World into existence to redress the balance of the Old,' in regard to his recognition of the revolted Sp. colonies in S. America, illustrates the vitality of the theory. The years before the First World War confirmed its place as a principle of modern European policy; the Triple Alliance was countered by the Dual Alliance, and by her *entente* with France and the later agreement with Russia, Great Britain left her 'splendid isolation' in order to maintain the equilibrium threatened by the increase of Ger. power and the weakness of Russia. The establishment in 1918 of the League of Nations was an attempt, in the words of Mr. Asquith (later, Lord Oxford and Asquith), to form 'a community of power' to replace the B. of P. The latter term became less prevalent than it once was, although the facts and the principle involved may be said to have remained. European public opinion became more influenced by opinion in the U.S.A., which has always been, in theory at least, against the B. of P. While formerly the principle was confined to European diplomacy, the tendency was to extend it to world politics; China and the Middle E. came into its sphere; the rise of Japan made the B. of P. in the Pacific a vital question for the future of Australia, and, as the event proved, not for Australia alone. The end of the Second World War revived the ideal of substituting an international authority for diplomacy based solely on the B. of P. See UNITED NATIONS. See also Hume, *Essay on the Balance of Power*; F. von Gentz, *Fragments on the Balance of Power*, trans. 1806; A. Tardieu, *France and Alliances*, 1908; L. F. L. Oppenheim, *International Law*, vol. 1, 1912; H. N. Brailsford, *War of Steel and Gold*, 1914; C. J. O'Donnell, *Lordship of the World*, 1925; and the *Cambridge Modern History*.

**Balance of Trade**, The, was a term applied to the balance of the profits of the exports and imports of a country. It was held that the wealth of a country

depended on the difference in gold between its exports and imports; if there was an excess in the value of exports over the value of the imports, the balance was in favour, if not, the balance was against the country. In consequence, legislation tended to protect the exports and place prohibitive taxes on the imports. This theory grew out of the mercantile system of political economy, and is now regarded as fallacious.

In addition to the exports and imports of commodities, settlements in respect of freights, insurances, loans, interest on loans, expenses of gov. abroad, receipt of tribute, etc., have to be made. These are known to economists as *invisible* exports and imports. For many years Britain was able to absorb an excess of imports in actual commodities over exports, an excess which is measured by many millions of pounds. This excess is paid for by the money received for *invisible* exports. In 1932, however, Great Britain abandoned its policy of free imports and instituted a tariff scheme, thereby gradually reducing the gap between imports and exports. But during the Second World War Great Britain was compelled to sell her foreign and, particularly, her Amer. securities in order to find foreign currency, and especially dollars, to finance her war requirements. In consequence imports in the shape of interest or dividends on foreign investments disappeared, whence, after the war, the country bent all its efforts on manufacturing certain goods exclusively for the export trade in the hope of reducing the great adverse balance of trade.

Putting aside *invisible* services, the money value of exports must equal the

money value of imports in theory, and the relative prices of commodities must be adjusted in such a manner as to attain this equality. If this adjustment were not made, the country with an excess of imports must export money for as long as the excess continued. This outflow of money would reduce prices to a point when it paid to export some commodities or not to import others. In other words, exports would be increased and the imports reduced and the B. of T. would be restored. New Zealand attempted to do this in 1933-39 when the Labour Gov. there, having spent large sums on social services, endeavoured to restore the balance by a drastic prohibition of all kinds of imports. Other modes of redressing an adverse balance are by the payment of export bounties or subsidies, and by barter agreements. See also TRADE.

**Balance Spring**, see HOROLOGY.

**Balanga**, cap. of Bataan, on the is. of Luzon, Philippines, on the W. side of Manila Bay, 34 m. from Manila. There is irrigation from the R. Talisay. Pop. 15,000.

**Balaninus**, a genus of coleopterous insect of the family Curculionidæ which includes many species of small size. The members of this genus have a long snout furnished with a pair of horizontal jaws which assist it in placing the eggs in the kernels of fruit. The egg hatches into a larva, when the creature feeds on the host-kernel, bores a hole through it, and assumes the pupa state when it has burrowed into the ground. They are cosmopolitan. *B. nucum*, the nut-weevil, attacks common nuts and filberts; *B. glandium*, the acorn.